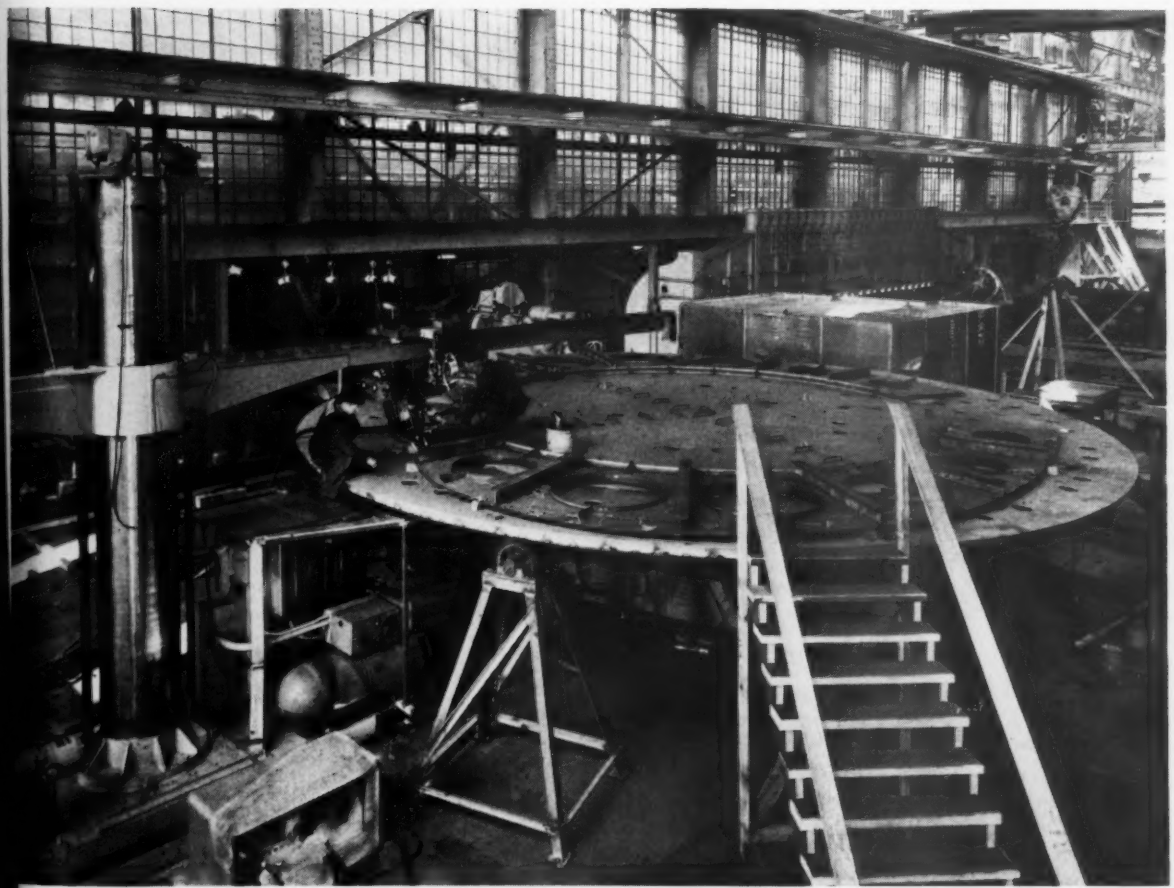
Western Industry

November 1954

Not a giant-sized record player, but a radial boom machine welder at Mare Island Naval Shipyard, Vallejo, Calif. Turntable places submarine components in position for welding below boom carriage.

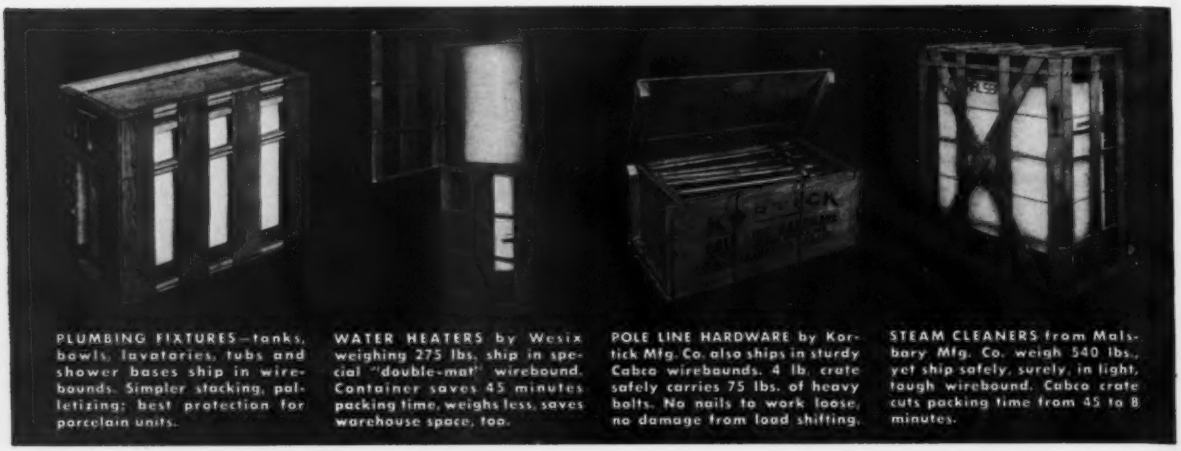
. . . see page 26



Training men for maintenance
Electronics boom in New Mexico
Rugged plastic: epoxy resins

Table of contents . . . page 4

Ever realize how many kinds of



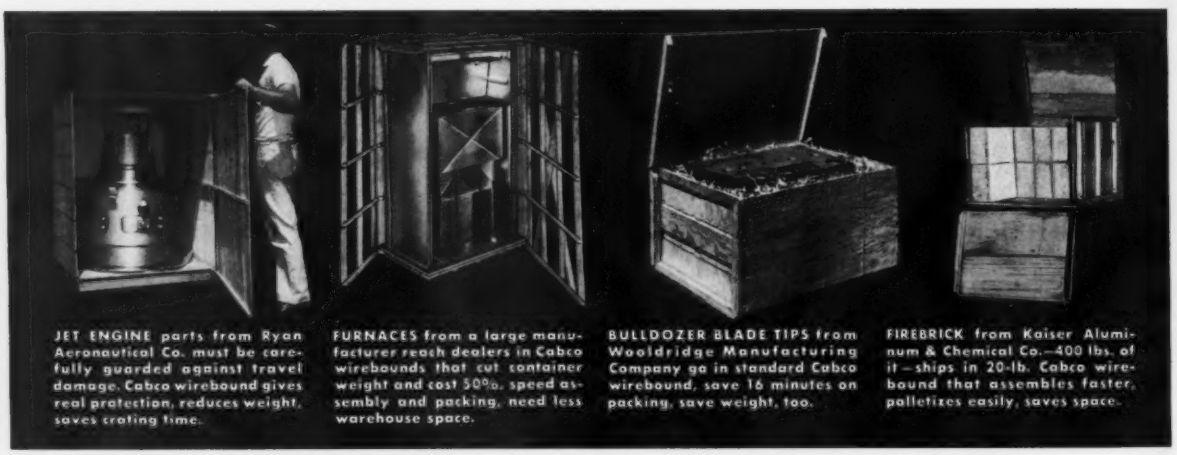
PLUMBING FIXTURES—tanks, bowls, lavatories, tubs and shower bases ship in wirebounds. Simpler stacking, palletizing; best protection for porcelain units.

WATER HEATERS by Wesix weighing 275 lbs. ship in special "double-mat" wirebound. Container saves 45 minutes packing time, weighs less, saves warehouse space, too.

POLE LINE HARDWARE by Kortick Mfg. Co. also ships in sturdy Cabco wirebounds. 4 lb. crate safely carries 75 lbs. of heavy bolts. No nails to work loose, no damage from load shifting.

STEAM CLEANERS from Malsbary Mfg. Co. weigh 540 lbs., yet ship safely, surely, in light, tough wirebound. Cabco crate cuts packing time from 45 to 8 minutes.

products ship more economically



JET ENGINE parts from Ryan Aeronautical Co. must be carefully guarded against travel damage. Cabco wirebound gives real protection, reduces weight, saves crating time.

FURNACES from a large manufacturer reach dealers in Cabco wirebounds that cut container weight and cost 50%, speed assembly and packing, need less warehouse space.

BULLDOZER BLADE TIPS from Wooldridge Manufacturing Company go in standard Cabco wirebound, save 16 minutes on packing, save weight, too.

FIREBRICK from Kaiser Aluminum & Chemical Co.—400 lbs. of it—ships in 20-lb. Cabco wirebound that assembles faster, palletizes easily, saves space.

in Cabco wirebound containers?

Add up the real cost of your present shipping container. How much to buy the container or its parts? How much to assemble; to pack? How much extra shipping cost for container weight that contributes nothing to strength?

Then, let a Cabco engineer show you the practical economics of Cabco wirebounds. These light, tough containers are engineered to your product. They fit perfectly, pack swiftly, save up to 50% on packing and shipping costs.

Sold only through

DUFF CALIFORNIA CO.

100 Bush Street, San Francisco 4 • 2581 E. Eighth Street, Los Angeles 23
501 Dooly Building, Salt Lake City 1

3028

Want to cut shipping costs up to 50%?

FREE BOOKLET SHOWS HOW CABCO WIREBOUNDS SAVE!

DUFF CALIFORNIA CO.
Dept. A, 100 Bush Street, San Francisco 4

Please send me booklet showing how leading manufacturers cut shipping costs.

Name_____

Company_____

Street_____

City_____ Zone____ State_____

For more details circle No. 1 on Reader Service Postcard

here is an additional line every welding supply distributor can handle profitably

whether or not you are now handling our line of welding and flame cutting apparatus these many air-gas torches will be of interest to you and can be handled by you at a desirable profit. Our brochure No. 8 illustrates and describes equipment which is noncompetitive but supplementary.

Is natural gas scheduled to replace a manufactured gas in your territory? If so, we have something of special interest to you and your Gas Company. If this conversion has been made in the past, we have equipment your customers will be interested in. We have designed, produced and used torches and other items for the control of flammable gases since 1910; and we have cooperated with gas manufacturers and public utility companies for many years. Please look at the column to your right for a partial listing of some of the torches our brochure illustrates and describes in a colorful and interesting manner . . . **write for it today**

here is a partial list of torches and operations listed in our Brochure #8:

ribbon flame burners for the glass blower and others . . .

crossfires for all fuel gases and either compressed air or pure oxygen . . .

small bench blowpipes for laboratories, radio technicians, electricians, orthodontists and others . . .

air-gas mixers for many purposes and in all capacities . . .

fine needle valves in all sizes . . .

a modern alcohol blowpipe for glazing, heat treating of molding compounds, smoothing wax surfaces or working with plastics . . .

cannon fires which can use many fuel gases with air or oxygen . . .

small air-gas torches for hand or bench use . . .

preheating torches in all sizes and capacities . . .

NATIONAL welding equipment company... 218 fremont street san francisco 5 california

it's made by

National of ...california

540 DEPT.

For more details circle No. 2 on Reader Service Postcard

Western Industry

NOVEMBER 1954

Vol. XIX, No. 11

ARTICLES

TRAINING FOR MAINTENANCE 31
Here's a program that benefits both employees and management by upgrading the company's present personnel.

ELECTRONICS BOOM HITS NEW MEXICO 34
Birthplace of nuclear weapons, test center for guided missiles, technical and artisan labor supply make this area a natural.

CARE OF TRANSFORMERS 36
Care for them and they'll care for you. Guide for scheduled maintenance of ventilated dry type and liquid filled.

TECHNICIAN OR ENGINEER? 38
Cal Poly and Utah State attempt to bridge the gap with curricula designed to meet today's engineering demands.

EPOXY RESINS 41
. . . a versatile, resistant new plastic with a wealth of Western uses.

WHO EXERCISES CONTROL FUNCTIONS IN SMALL PLANTS? . . 46
Part 3 of the small plant industrial management survey.

PRE-TEST YOUR FOREMAN TO GET THE RIGHT MAN 54
Evaluate what he will do, not what he is doing now.

ULTRASONIC PROCESSING COMES OUT OF THE LAB 64
. . . to help industry clean uncleanable parts and blend unmixable fluids.

SALES JOBS THAT FILMS CAN DO 68

DEPARTMENTS

Editorials 20
Letters 22
Calendar of Meetings 24
This Month's Cover 26
Efficiency Kinks 80
Films and Film Strips 86
New Equipment and Materials 88
Helpful Literature 99
Westerners at Work 107
Associations Elect 111
Trade Winds 112
Classified Advertising 116
The West On Its Way 117

ADVERTISERS IN THIS ISSUE 124

EDITOR
A. C. Prendergast

ASSISTANT EDITOR
Robert S. Wood

MANAGING EDITOR
John J. Timmer

NEWS EDITOR
Mary J. Beneditz

ASST. NEWS EDITOR
Marjory J. Maurer

CONSULTING EDITORS

C. Lloyd Thorpe

Roy C. Henning
Electricity and Electronics

W. J. O'Connell
Industrial Development Planning

PRODUCTION MANAGER
Patricia N. Mann

CIRCULATION MANAGER
E. F. Hubbard

Published monthly by

KING PUBLICATIONS
609 Mission Street
San Francisco 5, Calif.
Phone YUkon 2-4343

James I. Ballard . . . . President
Franklin B. Lyons . . Vice President
L. P. Vrettos . . V. P. & Treasurer

ADVERTISING SALES

Manager: Roderick V. Pierce

Representatives:

SAN FRANCISCO—Roderick V. Pierce
609 Mission Street
San Francisco 5, Calif.
Phone YUkon 2-4343

LOS ANGELES—Jerome E. Badgley
Vice President
128 So. Mansfield Avenue
Los Angeles 36, Calif.
Phone WEbster 8-8512

PACIFIC NORTHWEST—Arthur J. Urbain
609 Mission Street
San Francisco 5, Calif.
Phone YUkon 2-4343

CHICAGO—A. C. Petersen
3423 Prairie Avenue
Brookfield, Ill.
Phone HUnter 5-0532

NEW YORK—Richard J. Murphy
107-51 - 131st St.,
Richmond Hill, N. Y.
Phone JAmaica 9-2651

BPA NBP

50c per copy **$4.00 per year**

Acceptance under Section 34.64
P. L. & R. authorized

Copyright 1954 by King Publications

SERVING ALL INDUSTRY IN THE NATION'S FASTEST GROWING REGION

Pacific CUTS HANDLING TIME AND COSTS IN HALF....

for Downey Steel Treating Company

—yet actually improves QUALITY!

Continuous, *automatic* production line operation of this recently installed Pacific Shaker Hearth Furnace has reduced handling time and costs by 50% for the Downey Steel Treating Company. Up to 150 pounds of small parts are treated per hour—hardened, tempered and blued to exact specifications—without any handling! Parts are simply loaded onto the hearth, where they are automatically conveyed through the entire heat and quench cycle at a controlled rate, and are deposited in the tote box.

Yet, with all these important savings at Downey, quality of products has been improved...higher ductility...brittleness is eliminated...and longer wearing, completely finished parts are produced.

Accurate two zone temperature control provides distortion-free work of uniform hardness where specifications call for extremely close tolerances. Uniformity is maintained, regardless of size variation of the work.

Full muffle construction—Pacific's fabricated, one piece Inconel retort provides ideal conditions for all types of controlled atmosphere heat treating such as: bright hardening, annealing and surface hardening. And a unique new hearth design prevents buckling.

For help with your heat treating problems, and information on a modern Pacific Furnace that's engineered to your specific job —write today!

At Right: Partners Norman Barney and John A. Parks of Downey Steel Treating Co. examine finished parts as they come off the conveyor automatically.

Pacific ELECTRIC HEAT TREATING EQUIPMENT

PACIFIC SCIENTIFIC CO.
LOS ANGELES: 1430 Grande Vista Ave.
SAN FRANCISCO: 25 Stillman Street
SEATTLE: 421 Michigan Street
PORTLAND: Terminal Sales Building
ARLINGTON, TEXAS: 111 E. Main Street

☐ Send me more information on Pacific Shaker Hearth Furnaces.
☐ Please have a Pacific Representative call.
☐ I'd like more information on the complete line of Pacific Furnaces.

Name_____
Company_____
Address_____
City_____ State_____

For more details circle No. 3 on Reader Service Postcard

New booklets describe Bethlehem Pacific Steelmaking

There's a lot of fascination in steelmaking, not just to those of us in the business, but to nearly everybody. That's why we are glad to have groups visit our three West Coast plants and see it for themselves. We also have a number of interesting movie films, available to civic, professional, and educational groups, which show how steel is made and used in countless ways.

And now we offer three new booklets. In each are spectacular steelmaking scenes in full color; flow charts show how scrap is melted, rolled, processed and used to make everything from bed springs and bolts to buildings and bridges.

If you'd like to have one of these booklets—or if you want to make a group tour through one of our steel plants or fabricating works—just write us at Bethlehem Pacific Coast Steel Corporation, Publications Department, 20th & Illinois Streets, San Francisco 19, California. Please indicate whether you want the booklet describing our Seattle, Los Angeles or South San Francisco plant.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

Sales Offices: Los Angeles, San Francisco, Portland, Seattle, Spokane

BETHLEHEM PACIFIC

BETHLEHEM STEEL

For more details circle No. 4 on Reader Service Postcard

Have you written for your copy of this important new speed reducer catalog?

LET US PROVE TO YOU that dollar for dollar Western Gear speed reducers offer unequalled efficiency, reliability and longevity. Take advantage of Western Gear's industrial engineering service when replacing old units or designing new installations. Complete engineering service is yours without obligation.

Thos. J. Bannan, President

5449

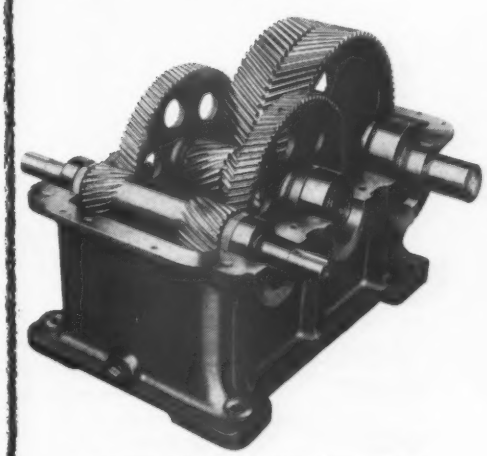
Since 1888

WESTERN GEAR WORKS

PACIFIC-WESTERN PRODUCTS | POWER TRANSMISSION GEARS • MACHINERY •

PACIFIC GEAR & TOOL WORKS · SOUTH WESTERN GEAR WORKS

Western Gear's 66 years of engineering and manufacturing skill combine to make this the finest line of speed reducers ever offered to industry!



For complete information please write Executive Offices, Western Gear Works, P.O. Box 182, Lynwood, California

PLANTS AT LYNWOOD, PASADENA, BELMONT, SAN FRANCISCO (CALIF.) SEATTLE AND HOUSTON—REPRESENTATIVES IN PRINCIPAL CITIES

For more details circle No. 5 on Reader Service Postcard

Radio Dispatch

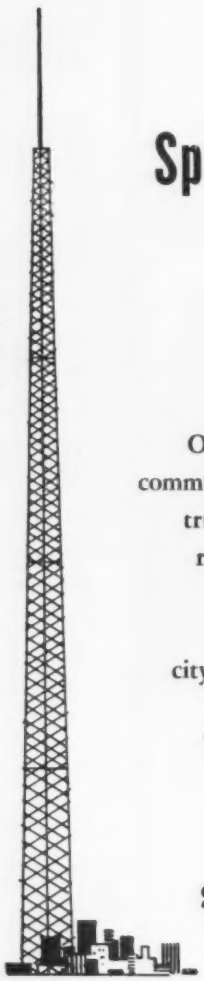
Speeds Consolidated Freightways Pickup and Delivery

Doing things *better* and *faster* for shippers is a long-standing CF policy.

Speeding freight pickups is an example. One way in which this is accomplished is by two-way radio communication between CF dispatching offices and city pickup trucks. Last minute orders are radioed to drivers on regular routes, eliminating possible delays in schedule departures.

Radio units have been in use at our Chicago terminal for several months. Most recent installation is in the CF city fleet in Oakland. Los Angeles and other major terminals are scheduled for radio-dispatch in the very near future.

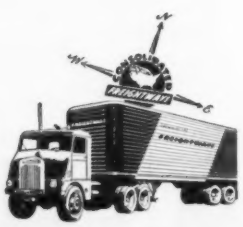
The point is this—we never stop improving equipment, terminals, personnel and methods to provide better motor freight service for you—*and your customers.*



CF SERVICES

- Motor Freight
- Local Cartage
- Pool Car Distribution
- Merchandise Storage
- Heavy Hauling
- Packing and Crating
- Moving Van Service
- Household Goods Storage

SHIP IT TODAY THE CF WAY



CONSOLIDATED FREIGHTWAYS INC.

General Offices: P. O. Box 3618, Portland 8, Oregon

Member National Defense Transportation Association

For more details circle No. 6 on Reader Service Postcard

Steel Problems?

Call Jorgensen First

Don't lose your head when you're faced with a steel problem. To **head off** trouble just call Jorgensen and an experienced representative will come to the rescue. Complete warehouse stocks of carbon, alloy, stainless, tool and specialty steels, as well as aluminum, are available for immediate delivery—you'll be way **ahead** when you *CALL JORGENSEN FIRST!*

EARLE M. JORGENSEN CO.
STEEL

LOS ANGELES	OAKLAND	HOUSTON	DALLAS	TULSA
10650 S. Alameda	1657 W. Grand Ave.	5311 Clinton Dr.	2200 W. Commerce St.	7311 East Pine St.
LOrain 7-1122	HIgate 4-2030	ORchard 1621	Riverside 1761	85-1511

For more details circle No. 7 on Reader Service Postcard

Keeping chemical cars from cooling

Here's a job that's really man-sized! The worker above is insulating a whole chemical tank car with fibrous glass. His job of attaching this heavy-duty material to the metal surface of the car is a lot easier now than ever before—thanks to a 3M adhesive. It used to take a lot of time and patience to attach the insulation using straps and clamps. Now one man can do the entire job in short order with a minimum of effort. The adhesive is brushed on to the tank car, the insulation is pressed into contact and cut to size. That's all there is to it!

As a result, warm chemical solutions can be shipped without losing their valuable heat, allowing chemical concentration to be kept at a high level while in transit.

See what adhesives can do for you . . .

For man-sized jobs, or little ones . . . look into 3M adhesives for the efficient, *practical* method of fastening. Your 3M sales representative will be glad to consult with you.

For more detailed data, write today to 3M's West Coast Adhesives and Coatings Division Office, Dept. 2211, 6411 Randolph St., Los Angeles 54, California.

see our catalog in PRODUCT DESIGN FILE or write for copy

Serving the West Coast **MINNESOTA MINING AND MANUFACTURING COMPANY**

ADHESIVES AND COATINGS DIVISION: 6411 Randolph Street, Los Angeles 54, Calif. • 1242 Sixth Avenue, Seattle 4, Wash. • 320 Shaw Road, South San Francisco, Calif.

For more details circle No. 8 on Reader Service Postcard

It took **SPECIAL FACILITIES** to help build this giant Hufford stretch-wrap machine

This giant Hufford Stretch-Wrap Forming Machine is used to stretch metal nearly to its yield point. It does this by gripping the ends of the metal, wrapping it around a die so that the metal molds itself to each configuration, then gives it a final stretch that slightly exceeds its elastic limit and sets the contour shape. Strength of the metal actually increases during fabrication.

The upper and lower main frame components of this machine weigh approximately 80 tons. As you can imagine, machining and assembling such a large, heavy machine requires a tremendous amount of experience and vast facilities. That's why National's Torrance plant was the logical source for this big job.

This type of work is typical of the many big jobs done at National's Torrance plant. The Torrance machine shop, for example, is equipped with over 300 lathes, boring mills, presses, milling machines and many other types of machine tools.

Why not visit Torrance and determine for yourself how National Supply's Industrial Products Division can help you on your next fabricating job.

INDUSTRIAL PRODUCTS DIVISION

THE NATIONAL SUPPLY COMPANY

TORRANCE, CALIFORNIA • LOS ANGELES AREA

IDEAL PRESSED STEEL FORGINGS • BILLETS AND LARGE BARS
STEEL CASTINGS AND SPECIAL MACHINERY
MELTING • FORGING • CASTING • MACHINING • HEAT TREATING
ASSEMBLING • WELDING • TESTING

For more details circle No. 9 on Reader Service Postcard

now you can use plating where you never could before!

Kanigen®

can give you new ideas about

NICKEL PLATING!

General American's new Kanigen *chemical* plating process overcomes many of the serious limitations of electro-plating. The simple patented Kanigen immersion process applies a uniform, controlled thickness of plate on *all* surfaces, interior and exterior. No bare or thin spots, no "build-up" even on big or complex parts. And Kanigen plating has the superior corrosion resistance of nickel, unusual hardness and durability.

A few of the ways companies are using General American's Kanigen plating service . . . how many fit *your* problems?

- **to simplify manufacturing.** Entire welded assemblies can be plated on a production-line basis.
- **to lower costs.** Carbon steel with Kanigen plate can often replace costly stainless steel.
- **to eliminate maintenance.** Pump parts, valves, pipes, conveyors, etc. can now be *plated* for long-lasting corrosion resistance.
- **to create new products.** Kanigen plating takes the shackles off designers!

Ask a General American engineer
how Kanigen can help you.

KANIGEN DIVISION
GENERAL AMERICAN TRANSPORTATION CORPORATION
12222 Olympic Blvd., Los Angeles 64, California

on
COMPLETE ASSEMBLIES

on BIG units

on COMPLEX shapes

For more details circle No. 10 on Reader Service Postcard

55% more powerful, yet lighter in weight!

New SKIL ¼" Model 75 Drill

More Rugged! More Comfortable in Use!
Cuts Costs! Easier to Operate!
More Efficient! Boosts Production!

Just one trial of this new SKIL Drill will prove its advantages to you: For here's a husky, heavy-duty drill that's 55% more powerful while it's actually *lighter* in weight!

In the SKIL Model 75 you'll find really outstanding performance combined with top operating power, longer operating life. A choice of 7 speeds available, from 500 to 5,000 r.p.m. . . . depending on your individual work needs. Capacity: ¼" in steel, ½" in wood. Have your distributor show you the SKIL "75" now!

NEW! SKIL Drill Model 78—Compact standard duty drill with ⅜" capacity in steel (⅝" in wood). Ideal for general purpose drilling. Produces high torque at 750 r.p.m. for tough jobs. Equipped with removable auxiliary side handle.

LOOK OVER THESE IMPORTANT FEATURES!

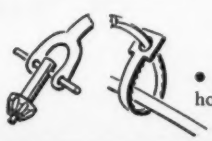
- All anti-friction bearings—for greater efficiency and low maintenance.
- Motor 55% more powerful, yet lighter than previous model.

- Contour-fit handle for easier and more comfortable handling.

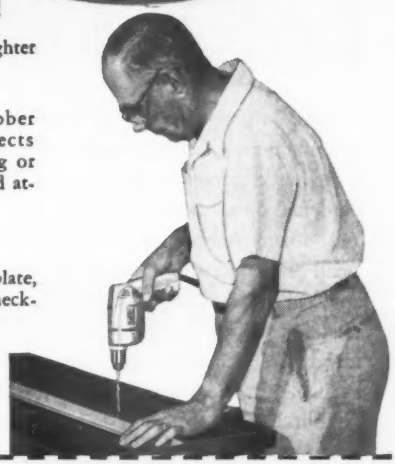
- Handy, safety-designed trigger lock for continuous operation—side location for easy operation.

- New molded rubber strain relief—protects cord against fraying or breakage at drill cord attachment joint.

- Larger inspection plate, easily removed for checking and cleaning.



- Convenient chuck key holder on cord.



SKIL
PORTABLE TOOLS

Made only by SKIL Corporation
formerly SKILSAW, Inc.
5033 Elston Avenue, Chicago 30, Illinois
2095 Dundas Street West, Toronto 3, Ontario
Factory Branches in All Leading Cities

FREE!

Send coupon! Let your SKIL Distributor prove to you—with a remarkable demonstration and free trial—that "SKIL is the answer" to your production bottlenecks!

SKIL Corporation, Dept. WI-114
5033 Elston Avenue, Chicago 30, Illinois

☐ I would like a demonstration and trial . . . FREE!
☐ Please send me illustrated literature on SKIL Drills!

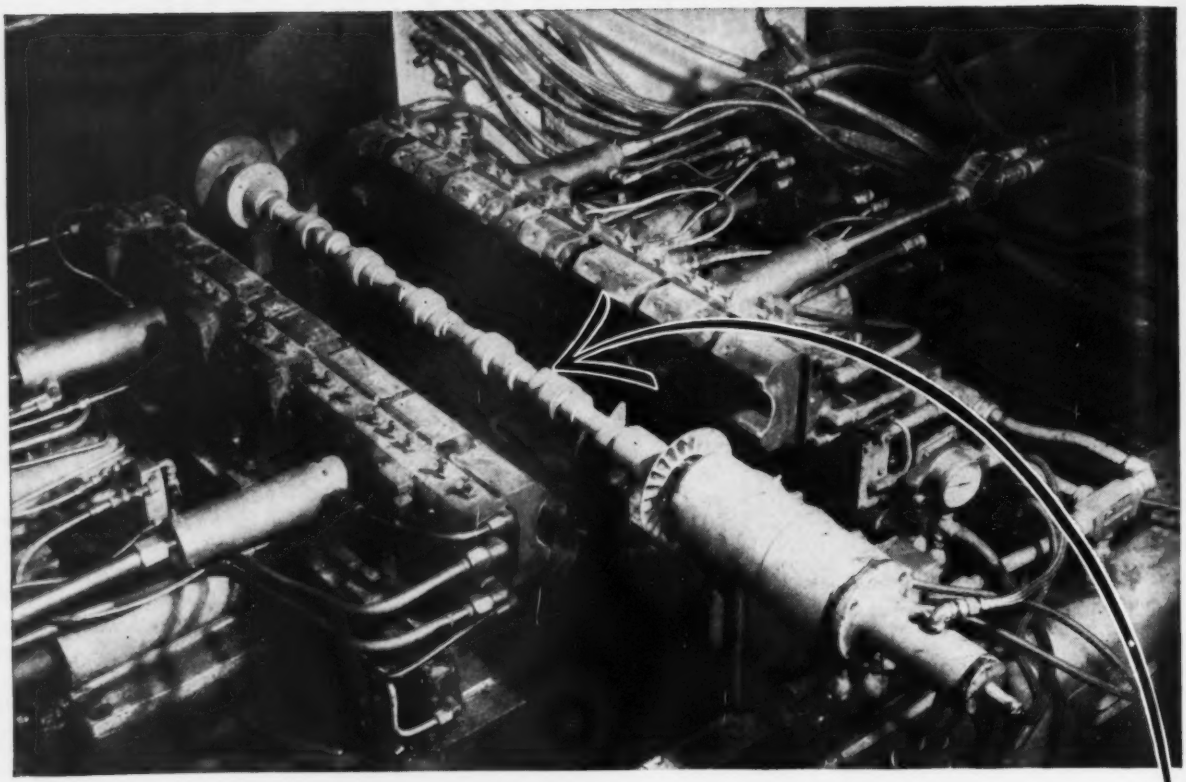
Name_____

Company_____

Street_____

City_____ Zone____ State_____

For more details circle No. 11 on Reader Service Postcard



Automatic Flame-Hardening Boosts Production 300%

Using an automatic oxy-acetylene flame-hardening machine, a leading manufacturer of trucks and marine equipment increased the production of flame-hardened gears, bearings, and camshafts 300 per cent. Parts are flame-hardened on as many as 22 different surfaces in fast, simple operations.

The flame-hardening process produces wear-resistant surfaces on large and small sections without heating the entire part . . . Distortion is at a minimum, and case depth is easily and accurately controlled. Flame-hardening is fast and relatively simple compared with other methods of hardening metal such as nitriding and carburizing. Low cost, portable flame-hardening equipment is available for the majority of applications.

Your local LINDE representative will be glad to show you how to produce machine parts with a tough, ductile interior and a hard, wear-resistant surface. Start saving now, call him for more information on flame-hardening.

A cross-section view of this camshaft shows an even, uniform depth of the hardened surface.

Linde
Trade-Mark

LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY
Division of Union Carbide Canada Limited, Toronto

"Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

For more details circle No. 12 on Reader Service Postcard

LET REPUBLIC SUPPLY YOUR NEEDS!

He said: "This is worse than the time we blew a fuse during an eclipse. It must have been 120° when that cooling coil blew..."

We said: "Keep cool. Your valves, copper tubing and fittings are already on the way. You see your order's been filled while we've been talking. It's probably at your door right now!"

Moral: You never get a cold-shoulder reception when you *let Republic Supply your needs!* Any emergency is our emergency, too...and whether it's a single maintenance replacement part, or a big, new production job, you'll get the same prompt, friendly service. Try us and see!

THE republic supply COMPANY OF CALIFORNIA

Main offices in Los Angeles & San Leandro. Phones—Los Angeles: RAymond 3-2511, PArkview 8-7151; San Leandro: LOckhaven 2-0414, Enterprise 1-1060
Pipe, valves and fittings • abrasives • shop supplies and tools • rigging materials • mechanical rubber goods • machinery • oil field supplies

An independently owned and operated company serving Western Industry
For more details circle No. 13 on Reader Service Postcard

now producing precision investment castings for western industry

Arwood opens plant number 4

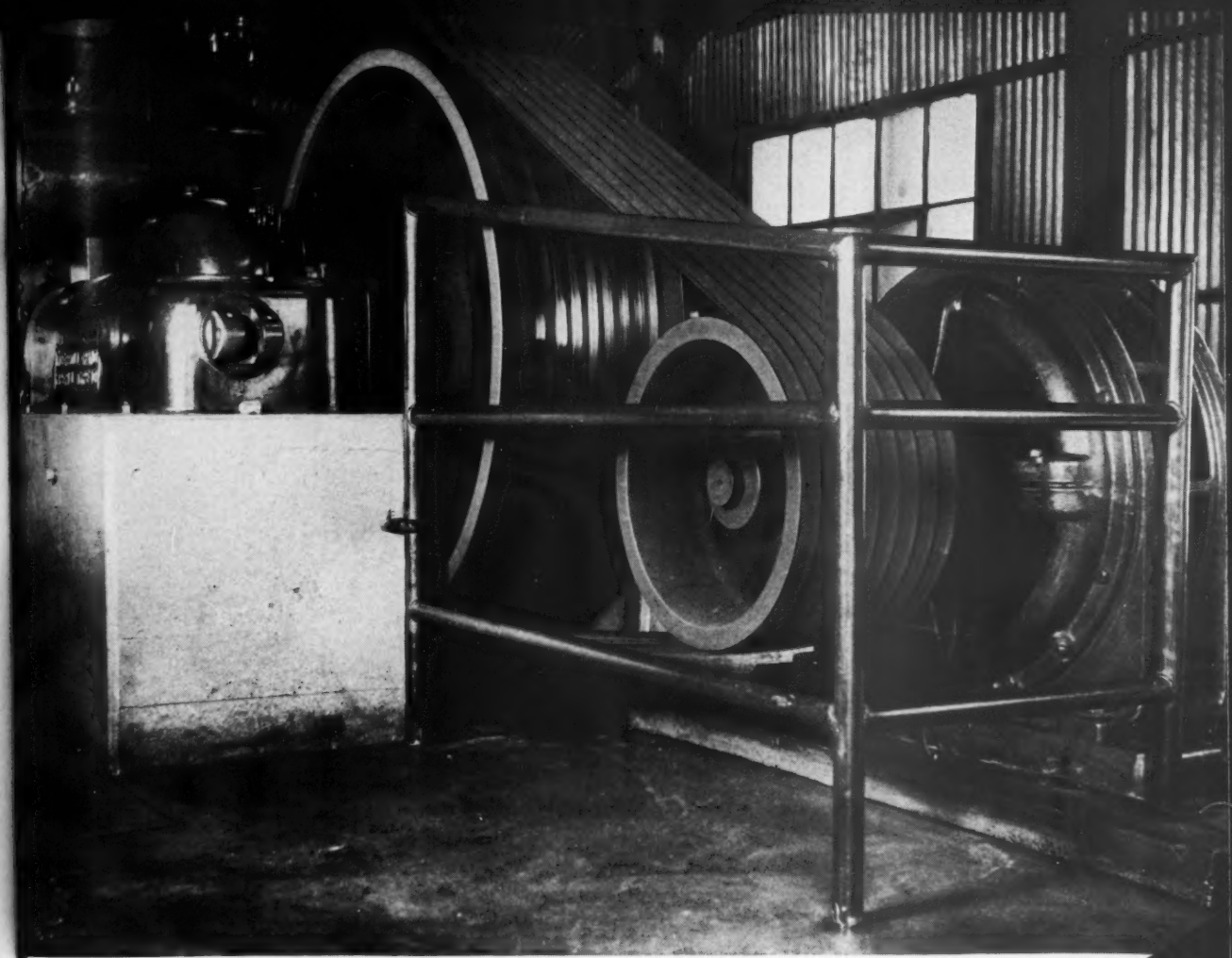
The growth of western industry and its exacting requirements have brought to California Arwood's fourth investment casting plant. Here you'll find the advanced tooling, metallurgical, and testing facilities necessary to serve you with the highest quality of precision investment castings. Small, intricate, investment-cast parts require no machining . . . quantities of these parts can be cast in unmachinable metals . . . and several parts can often be cast into a single assembly. Applications are virtually unlimited.

Arwood's engineers will be pleased to show you how you can save money and time. Won't you phone us or visit our plant? Technical consultation is free of obligation.

WESTERN SALES OFFICES:
- **DEAN LEWIS ASSOCIATES**
  219-21 Ninth Street, San Francisco 3, Calif.
- **THE HOUSTON COMPANY**
  110 Administration Bldg., Seattle, Wash.

Arwood PRECISION CASTING CORPORATION
3037 South Vail Avenue, Los Angeles 22, California
Telephone—Raymond 3-5361

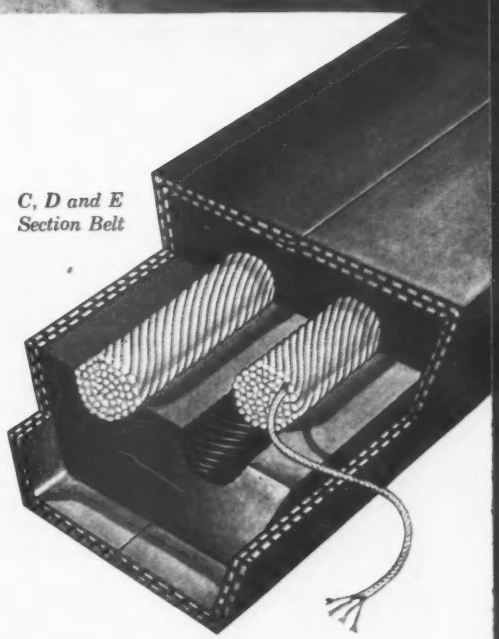
For more details circle No. 14 on Reader Service Postcard



Thermoid Multi-V Belts cut operating costs

There's a Thermoid V-Belt for every plant application. Every belt is *pre-stretched* to provide longer service and maximum power transmission without slippage. Thermoid C, D and E sections are rayon-grommeted for brute strength and extra flexibility that withstands repeated shock loads. The entire belt is vulcanized into a solid unit that resists moisture, abrasion, internal friction and heat.

Get longer wear with less maintenance . . . cut your operating costs with Thermoid Multi-V Belts. To meet the exacting requirements of any plant service, your Thermoid Distributor carries a complete line of Thermoid Multi-V Belts, Hose and Conveyor Belting. Call him or write direct for complete information.



C, D and E Section Belt

Thermoid Western Co.

Conveyor & Elevator Belting • Transmission Belting • F.H.P. & Multiple V-Belts
Wrapped & Molded Hose • Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Offices and Factories: Trenton, N. J. Nephi, Utah

For more details circle No. 15 on Reader Service Postcard

How we opened the door to lower costs for Ford

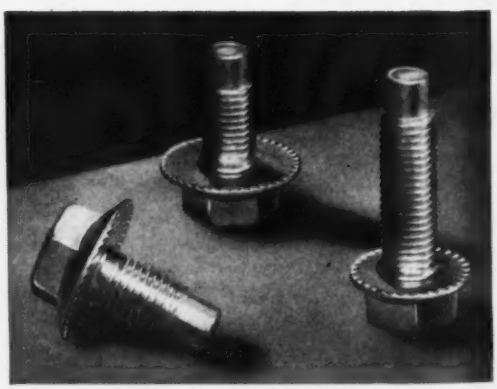
Two hinges on every Ford door. Six screws and 12 washers for each hinge.

Did this present an opportunity for cost reduction? An RB&W "fastener engineer" thought so. And after careful analysis and time studies Ford engineers agreed.

The solution: RB&W Hex SPIN-LOCK screws to fasten the hinge to the door, eliminating the need for washers. And special wide-flange Hex SPIN-LOCK screws for attaching the hinge to the frame, doing away with more washers. The wide flange is necessary to cover an elongated hole in which the hinge moves to permit accurate alignment.

Result — parts requirements are cut by two thirds, assembly is simplified, purchasing and inventory costs are lowered. And RB&W SPIN-LOCK screws hold those door hinges tight for good.

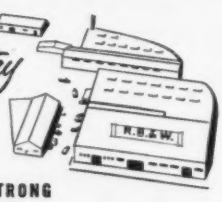
We will be glad to send an RB&W man around to check up on your fastening operations. Every problem is different, of course, but RB&W has a fastener for just about every job. If you need a "special", as Ford did, we'll design and make it for you. Write RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, New York.



FASTER ASSEMBLY, reduced costs were the pay-off, using RB&W designed wide-flange SPIN-LOCK screws (left) for door hinge. Other SPIN-LOCKS (right) hold hinge on door. SPIN-LOCK screws *can't loosen* because ratchet-like teeth lock into surface and hold tight.

3.10

RB&W *serves Western industry with the complete quality line*

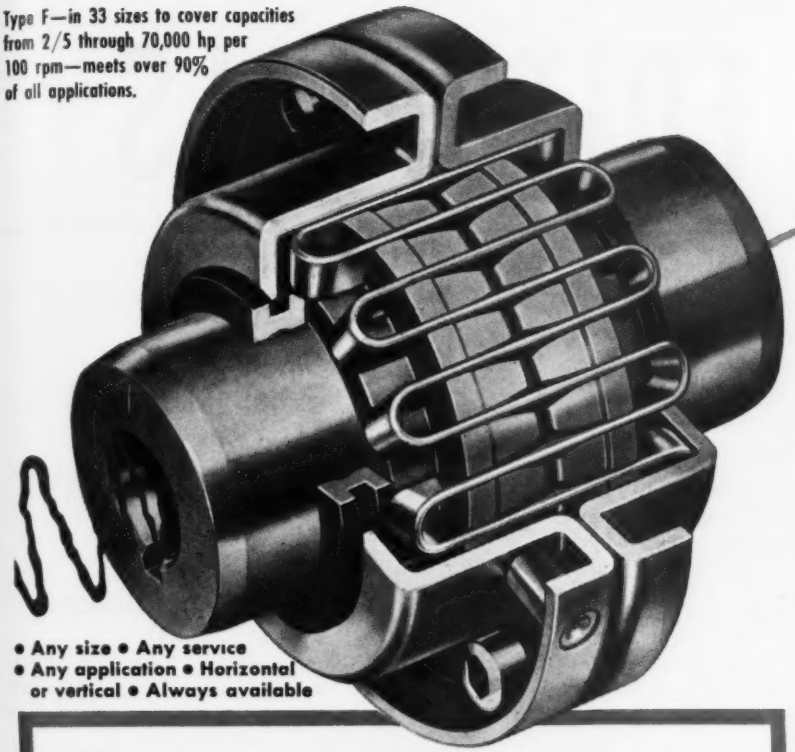


WEST COAST PLANT: 4466 Worth St., Los Angeles, Calif. Other plants: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill. Additional sales offices: San Francisco; Dallas; Chicago; Detroit; Pittsburgh; Ardmore (Phila.), Pa.; Sales agents: Portland, Seattle. Distributors from coast to coast.

109 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

For more details circle No. 16 on Reader Service Postcard

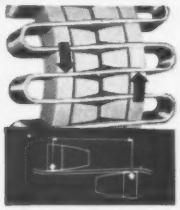
Type F—in 33 sizes to cover capacities from 2/5 through 70,000 hp per 100 rpm—meets over 90% of all applications.



• Any size • Any service
• Any application • Horizontal or vertical • Always available

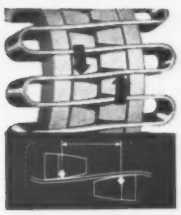
Exclusive FALK Steelflex grid-groove design smothers shock and vibration.

The damaging effects of shock and vibration can shorten the life of any connected machinery. Here is how the Steelflex grid-groove design overcomes these common enemies.



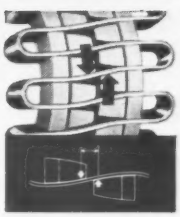
Under LIGHT LOADS

The gridmember bears only at outer edges of grooves. The long span between points of contact remains free to flex under load variations.



Under NORMAL LOADS

As load increases, the distance between supports on the grooves is shortened proportionately, but a free span remains to cushion shock loads.



Under SHOCK LOADS

Under extreme overloads, the grid-member bears fully on the grooves and transmits full load directly. The coupling remains flexible, within its rated capacity.

Why FALK Steelflex Couplings give the *finest* protection for connected machinery

Maximum protection of connected machinery is best provided by Falk Steelflex Couplings because, thanks to their exclusive design, they overcome the damaging conditions of shock loads, shaft misalignment and vibration. How this unique multiple protection is made possible is shown at the right.

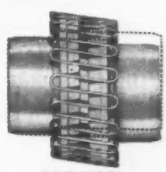
Falk Steelflex Couplings give the most economical protection, too, because they make connected machinery last longer and give better service. Furthermore, when actual coupling costs are figured per year of service, Falk Steelflex Couplings show substantial savings through their rugged all-steel construction, easy interchangeability and low maintenance requirements.

IMMEDIATE DELIVERY from West Coast stocks

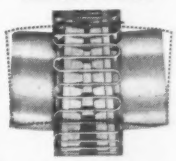
Couplings and spare parts in Factory Stock at Oakland, California and Portland, Oregon. Authorized stocking Falk Distributors throughout the West.

...Accommodates shaft misalignment and free end float

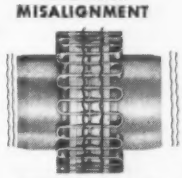
Basic maintenance procedure dictates regular inspection and correction of shaft alignment. Between inspections, Steelflex couplings provide protection by accommodating unavoidable shaft misalignment and end float. The gridmember which connects the two hubs of a Steelflex coupling is not fastened to either hub, so each hub can shift without imposing load on the other shaft.



PARALLEL MISALIGNMENT



ANGULAR MISALIGNMENT



FREE END FLOAT

THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK

...a good name in industry

For more details circle No. 17 on Reader Service Postcard

Western Industry

EDITORIALS

Breath of fresh air

IT'S A breath of fresh air, after all the hue and cry about giving small business more defense work (because the "smalls" need the money), to hear of an organization asking for it on the ground that its members can do the job more economically than the primes.

It seems to be rather widely assumed that subcontractors are merely marginal operators who logically must suffer when defense programs shrink, because the primes will then do the work themselves.

The newly-organized Small Defense Industries Assoc. in Los Angeles says, "Give us a chance to prove ourselves; if we can't do it cheaper and better, we don't want the work." Its speakers put forth some apparently strong arguments:

(1) In many jobs the subcontractor, with his flexibility, is more efficient than the prime. (2) The prime should be given a financial incentive to subcontract whenever manhour efficiency of the sub excels. (3) The government should not allow primes less profit on subcontracted items than on items produced in its own plants or in government facilities operated by the primes. (4) Competent small plants with their great reserve of skill and know-how should be included in mobilization planning as individuals. (5) Continued construction of governmental facilities should be stopped until it is proven that existing privately-owned free enterprise companies are unable to handle the work involved.

Not Indians now

IN OCTOBER 1952 WESTERN INDUSTRY printed the following editorial: "The United States Chamber of Commerce announces the appointment of 34 business leaders to its Manufacture Department Committee. Not one comes from the eleven Western States." Over the editorial appeared the heading "Still just Indians."

We are indebted to Reuben D. Siverson, manager of the above department, for a list of members of the same committee for 1954-1955. It has 46 members: 18 of them are from the eleven Western States!

Our thanks to the U. S. Chamber for such generous recognition of the West. Our thanks also to the readers of WESTERN INDUSTRY, who have made it possible for us to speak up for the West whenever the occasion demands.

Articulating the inarticulate

OUT OF A request by Long Beach State College for help in setting up a degree program in aeronautics comes a report from one company which says in part:

"From our own experience in hiring engineering graduates, we have found that one of the most serious problems confronting us is the inability of the graduate to communicate his knowledge, either orally or in written form. As a direct result of this inability to express himself, there seems to be a strong tendency to take refuge behind the mathematical result obtained in solving a given problem and, whenever possible, avoid explaining how the result was obtained.

"As a further result of this inability to communicate adequately, we found it necessary here at this company to employ a full-time editor of technical reports originating with the company, whose sole duty is to examine these reports for spelling, punctuation, grammar, syntax, and orderliness of presentation of the material."

We could belabor the poor engineers a bit, too. But then we have to think of the remark about the engineers at a recent conference, "Yes, we have some of these fuzzy-haired guys, too, who spend all their time dreaming up wild things. But then that's why we make so much money."

Adding Strength to Freedom's Wings...

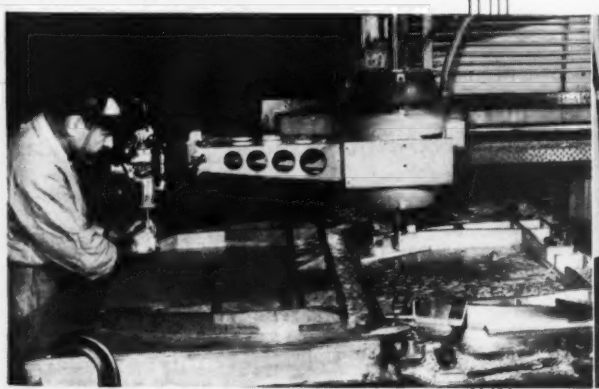
New defender of America's far-flung outposts is the Douglas F4D Skyray, fastest carrier-based jet airplane ever built and holder of the world's speed record.

To make such planes as the Skyray possible, Aircraft Tapered Sheets, Inc., manufactures integrally stiffened structural components of great strength and stability by precision machining and milling of solid blocks of 75-ST aluminum alloy.

Protecting these three-dimensional hydraulic duplicating devices as they turn out their high precision work are the Gargoyle lubricants recommended by the equipment manufacturer.

According to Paul Langston, foreman at the Burbank, Calif., plant, "Our entire production is dependent upon the proper functioning of our hydraulic tracing and duplicating equipment and on the Gargoyle lubricants that help keep them running without breakdown —our confidence in these products has been fully justified."

Precision milling of an aircraft structural element is effected by this hydraulic tracing equipment.



Paul Langston (right) foreman of the Burbank Plant of Aircraft Tapered Sheets, Inc., discusses machine lubrication problems with Wendell Hagen, General Petroleum representative.

SOCONY-VACUUM

GENERAL PETROLEUM CORPORATION

Converting nature's gift for better living

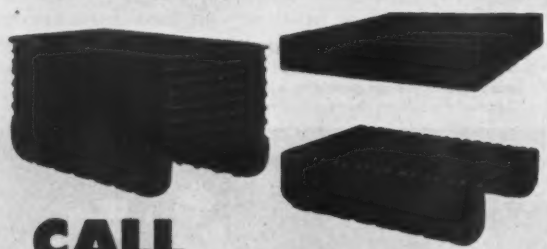
Like so many other West Coast firms, you can place your confidence in the General Petroleum lube engineer and the products he recommends. Backed by more than 88 years of industrial lubrication experience, your nearby G. P. man is trained to save you money, to keep your machinery running better longer... Call him today for a lubrication survey of your plant's equipment.

2-1013

For more details circle No. 6 on Reader Service Postcard

IT'S SMART----

---TO PLAY SAFE
WITH LONG WEARING
ALL STEEL EQUIPMENT



CALL
POWELL*
NOW

Be smart! Why take chances when it costs so little to play safe with rugged, maintenance-free all-steel equipment that can be used over and over and over again. Compare all costs and you'll specify all-steel by Powell.

* Originators and leading producers of cold-formed all-steel materials handling equipment. Powell—Since 1920.

WEST COAST REPRESENTATIVES

IRA G. PERIN CO. SAN FRANCISCO LOS ANGELES
AIR MACK, INC. of WASHINGTON — SEATTLE
AIR MACK, INC. of OREGON — PORTLAND

For more details circle No. 19 on Reader Service Postcard

LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if requested. Unsigned letters will be disregarded.

Valuable surveys

Editor, WESTERN INDUSTRY:

In the September issue of WESTERN INDUSTRY reference was made (page 50) to surveys taken in 1950, February 1952, and December 1953 for management practices in the West. We are writing to ask if you would be kind enough to send us reprints of such surveys.

A. A. COWAN
Engineer
Bobrick Manufacturing Corp.
Los Angeles

Learning curve

Editor, WESTERN INDUSTRY:

In the latter part of 1952 you published a series of articles in WESTERN INDUSTRY called "The Learning Curve" by Glen E. Ghormley. I have just come across the third article in the series and am very eager to secure a copy of each of the others.

T. ROBERTSON
Retail Manager
Arden Farms Co.
Glendale, Calif.

Choosing your brass

Editor, WESTERN INDUSTRY:

Will you please send me a reprint of the article "How To Choose Your Next Executive and Get the Man You Want" by James T. Lang, issued in your May 1954 publication WESTERN INDUSTRY. Thank you.

B. B. BRADFORD
Manufacturing Engineering
General Electric Co.
Richland, Wash.

Industrial and Protective Coatings

that wear better!

Especially formulated to protect metal, wood, concrete—submerged or not; acid and alkali resistant. Colors available. *Full free details, write for:* Folder 575, Dept. 8.

An Inertol Product

INERTOL CO., Inc.
27 So. Park, San Francisco 7

For more details circle No. 46 on Reader Service Postcard

CUTTING OIL

whatever you need ...we have it!

Every cutting oil requirement is fully met in the complete selection of years-ahead cutting oils by Richfield. There is no finer or more economical line.

Here are cutting oils for every purpose—every operation. One Richfield cutting oil may prove to be the correct one for many or even all your requirements.

Consult your Richfield representative for the sure way to cut cutting oil costs.

If it's RICHFIELD it's RIGHT

RICHFIELD®

RICHFIELD OIL CORPORATION

For more details circle No. 20 on Reader Service Postcard

CM HOISTS

Put your OVERHEAD plant space to work!

You pay plenty for overhead plant space. It's valuable. Use it to move or store materials with CM Hoists. You'll have extra floor space for more valuable operations.

Many Thousands at work in leading plants

CM COMET ELECTRIC HOISTS
⅛ to 2 tons

- Push button or pendant rope control. Anyone can operate.
- Use on 110 or 220-440 volt lines. Extremely low power cost.
- Fully enclosed mechanism. Lifetime lubricated. Minimum maintenance.
- Flexible Herc-Alloy steel load chain. Upper-lower safety limits.
- Durable, safe, versatile, efficient.

COMET Catalog 150
...18 pages of information Get a copy today for your file.

ALSO Meteor Wire Rope Electric Hoists (½ to 5 tons), Cyclone Hand Hoists (½ to 10 tons), CM Pullers (¾ to 6 tons), CM Trolleys and CM Cranes.

➡ Call the CM distributor for catalogs, prices and quick delivery from stock

CM HOISTS AND CHAIN

CHISHOLM-MOORE HOIST DIVISION
COLUMBUS McKINNON CHAIN CORPORATION
TONAWANDA, NEW YORK
REGIONAL OFFICES: NEW YORK, CHICAGO, CLEVELAND
In Canada: McKINNON COLUMBUS CHAIN LIMITED, ST. CATHARINES, ONTARIO
For more details circle No. 21 on Reader Service Postcard

CALENDAR OF MEETINGS

NOV. 17—*Western Area Development Conference*, Mark Hopkins Hotel, San Francisco. Contact C. L. Hamman, Stanford Research Inst., Palo Alto, Calif.

NOV. 18-19—*Nat. Assoc. of Corrosion Engineers*, Western Region, conference, Hotel Biltmore, Los Angeles. Contact J. G. Kerr, C. F. Braun & Co., 1000 S. Fremont Ave., Alhambra, Calif.

NOV. 18-19—*Pacific Coast Electrical Assoc.* and *Pacific Coast Gas Assoc.*, joint conference, Sir Francis Drake Hotel, San Francisco.

NOV. 29—JAN. 9—*First All-California Good Design Exhibition*, Pasadena Art Museum, Pasadena, Calif.

DEC. 3-4—*Northwest Mining Assoc.*, Davenport Hotel, Spokane, Wash. Contact Association, MA 4822, Spokane.

DEC. 13-15—*Inland Empire Industrial Exposition*, Coliseum, Spokane, Wash. Contact Neal Fosseen, Washington Brick & Lime, E. 7621 Sprague, Spokane.

DEC. 26-31—*American Assoc. for the Advancement of Science*, 121st meeting, University of California, Berkeley, Calif. Contact Dr. Raymond L. Taylor, c/o Assoc. office, 1515 Massachusetts Ave. N. W., Washington, D. C.

1955

JAN. 10-11—*Northwest Frozen Foods Assoc.* convention, Olympic, Hotel, Seattle. Contact Assoc. office, Title and Trust Bldg., Portland.

JAN. 12-13—*Northwest Canners Assoc.*, annual convention, Olympic Hotel, Seattle. Contact Assoc. office, 514 Board of Trade Bldg., Portland 4, Ore.

JAN. 24-27—*American Management Assoc.*, general management conference, Hotel Statler, Los Angeles. Contact AMA headquarters, 330 W. 42nd St., New York 36

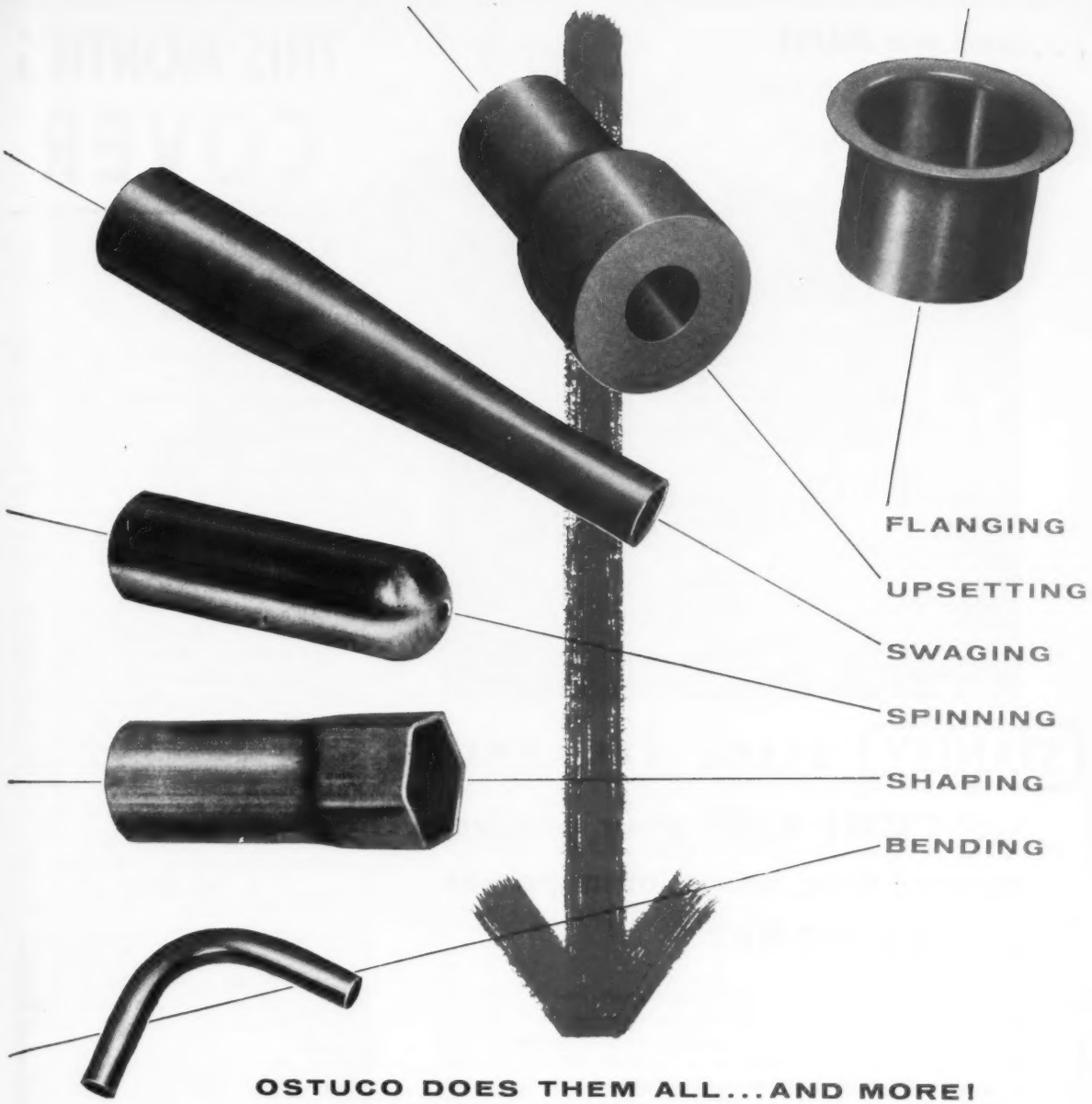
JAN. 27-28—*Fruit and Vegetable Sample Cutting for Canners League of California*, Fairmont Hotel, San Francisco. Contact M. A. Clevenger, 215 Market St., San Francisco.

FEB. 3-4—*Western Frozen Foods Processors Assoc.* convention, Hotel Senator, Sacramento, Calif.

FEB. 3-5—*Colorado Mining Assoc.*, annual meeting, Denver. Contact Robert S. Palmer, executive vice president, 204 State Office Bldg., Denver.

FEB. 8-10—*Society of the Plastics Industry*, Reinforced Plastics Division, Statler Hotel, Los Angeles. Contact Samuel S. Oleesky, Micronics, Inc., 1614 W. 134th St., Gardena, Calif.

FEB. 14-15—*Vertical Turbine Pump Assoc.*, Hotel Mark Hopkins, San Francisco. Contact H. DeVoe Rea, executive manager, 453 S. Spring St., Los Angeles.



OSTUCO DOES THEM ALL...AND MORE!

OSTUCO carbon or alloy steel tubing is manufactured, fabricated and forged to your exact specifications . . . *all under one roof.* If you want to know more about the advantages of a "single source" where one purchase order takes care of all details, send for our latest catalog, "OSTUCO Tubing." Better still, send us your blueprints for prompt quotation.

OSTUCO TUBING

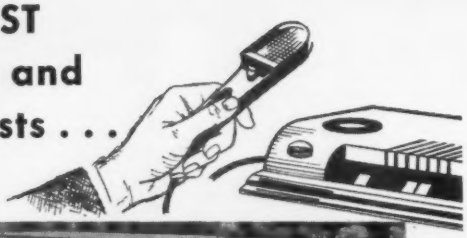
SEAMLESS AND ELECTRIC WELDED STEEL TUBING
—Fabricating and Forging

OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company • **SHELBY, OHIO**
Birthplace of the Seamless Steel Tube Industry in America

SALES REPRESENTATIVES: LOS ANGELES (Beverly Hills), 170 So. Beverly Drive, Suite 300, Telephone Crestview 6-7614
SALT LAKE CITY, 1361 Stratford Avenue, Telephone 84-1662
SAN FRANCISCO, 681 Market Street, Telephone Exbrook 2-7017
SEATTLE, 3102 Smith Tower, Telephone Seneca 5393
CANADA, RAILWAY & POWER CORP., LTD.
EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY
117 Liberty Street, New York 6, New York

For more details circle No. 22 on Reader Service Postcard

. . . and we MUST cut packing and shipping costs . . .



STANLEY STEEL STRAPPING

will "UNI·TIE" your product to save time, space, man-power . . . and MONEY

The end of the production line isn't where cost-cutting ends. Stack your goods on skids or pallets and "Uni-tie" with STANLEY Steel Strapping. You'll substitute piece-by-piece handling for a compact load that one man can move quickly, store in a minimum of space in warehouse or freight car, and load or unload easily and rapidly. You'll reduce materials handling damage, give your product positive protection . . . and cut costs all along the line. In your case, as in the illustration above, "Uni-tieing" may eliminate costly individual containers.

Mail coupon TODAY for your copy of the FREE booklets "Uni-tie Your Products . . ." and "Keep Your Production Lines Moving!"

STANLEY INSURE IT – SECURE IT WITH STANLEY STEEL STRAPPING

STEEL STRAPPING DIVISION

THE STANLEY WORKS, 21511 LAKE STREET, NEW BRITAIN, CONN.
Telephone: BAldwin 9-2021

☐ *Please send booklets* ☐ *Please have representative call*

NAME_____

POSITION_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

STANLEY TOOLS • STANLEY HARDWARE • STANLEY ELECTRIC TOOLS
STANLEY STEEL STRAPPING • STANLEY STEEL

For more details circle No. 23 on Reader Service Postcard

THIS MONTH'S COVER

SUBMERGED ARC WELDING on submarines

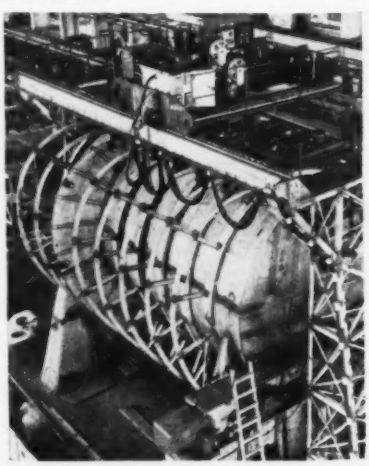
PLENTY of components go into the construction of a modern day submarine, and a good portion of them are assembled with the help of submerged arc welding. Welding equipment is often peculiar to the particular requirements of the job, as evidenced by the radial boom machine welder making fillet welds joining radial tee bar stiffeners to floor, on this month's cover.

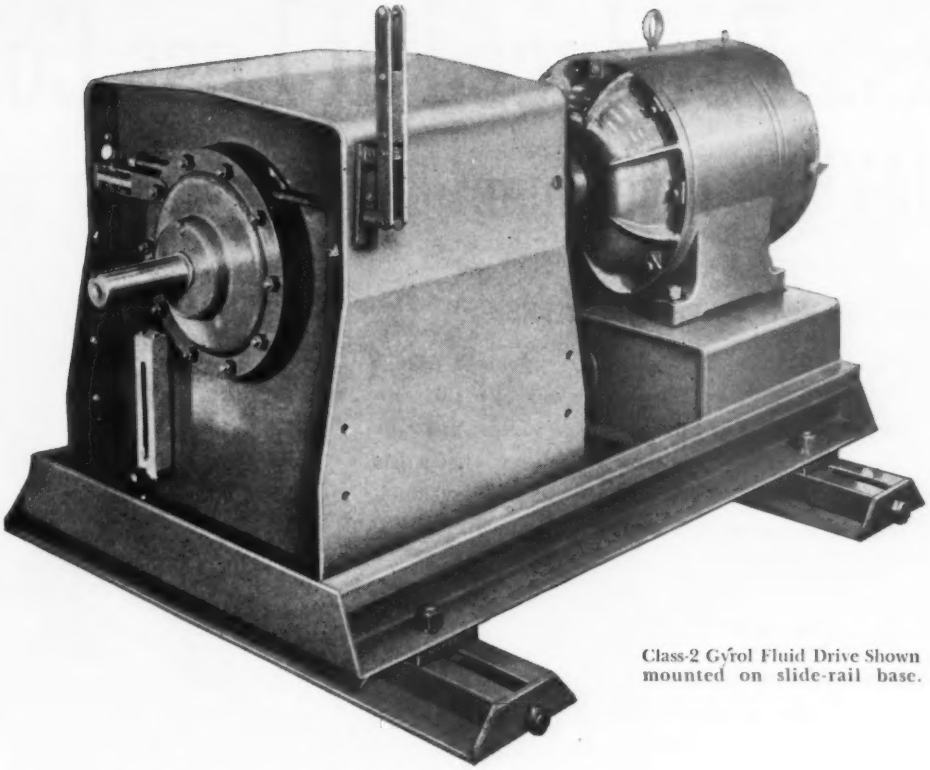
This equipment was designed and developed at Mare Island Naval Shipyard in San Francisco Bay, one of the principal submarine design and building yards in the nation and the only activity of this sort in the West. Mare Island has recently been selected by the Navy Department as the Pacific Coast yard for future repair and construction of nuclear-powered vessels.

During the 100 years since its inception, the yard has constructed 493 craft of all descriptions and is currently building the submarine Grayback, its 28th undersea craft.

Large structural submarine sectional assemblies are fabricated in the structural shop using a gantry crane welder with twin equipoise welding heads.

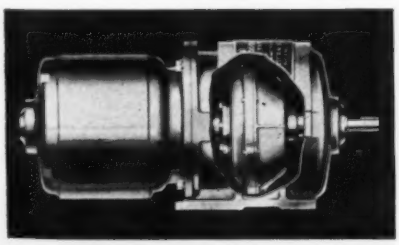
A gantry crane welder fastens I-bar frames, wing bulkheads, and floors to a submarine's pressure hull.





Class-2 Gyrol Fluid Drive Shown mounted on slide-rail base.

New Gyrol fluid drive offers dual rotation,* adjustable speed



For smaller applications—American Blower TM Constant-Speed Gyrol Fluid Drive. Available in ratings from 1 to 20 hp.

Get the facts today!

Write to: American Blower Corporation, Dept. 180-6, Detroit 32, Michigan. Ask for a copy of Bulletins 9419 and 9519. They will be sent to you promptly along with any other information you may require.

Look at all these features

- *Can be reversed while in motion by reversing motor
- Trigger-action response—adjustable speed
- Speed range 5-1
- Permits across-the-line starting on many applications
- Motor can reach full speed before engaging load
- A compact, self-contained unit
- Speed may be controlled manually or automatically
- Six sizes, 7½ thru 800 hp — speeds up to 1800 rpm

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN • CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of American Radiator & Standard Sanitary Corporation

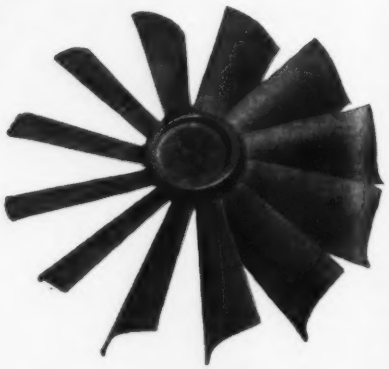
AMERICAN BLOWER

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

For more details circle No. 24 on Reader Service Postcard

Mass-Produced at Less Cost...

by HAYNES Investment Casting
Trade-Mark



PRODUCED FOR 74 PER CENT LESS

Originally this turbine wheel was machined from a 20-lb. forging to a final weight of a little over 1 lb. Now the part is produced by investment casting and only 2 oz. of metal is removed. Investment casting has brought about a 74 per cent reduction in production costs by saving strategic metal and machine time.

COST CUT 60 PER CENT

This investment-cast motor mount was made in a high-strength alloy at 60 per cent less than the cost of a forging. The mount bears the entire weight and torque of a 100-lb., 15-horsepower aircraft starter motor. The investment-cast parts require only four simple finishing operations.

ASSEMBLY COSTS REDUCED

Investment casting made it possible to produce this cylinder head in one piece, eliminating extra assembly costs. Machining was reduced to a minimum. The design of the part is special to investment casting. The castings weigh about 25 lb. and are 7 in. in diameter.

HAYNES *investment castings can solve some of your own production problems. For more information, contact the nearest Haynes Stellite Company office listed below.*

"Haynes" is a registered trade-mark of Union Carbide and Carbon Corporation

HAYNES INVESTMENT CASTINGS
TRADE-MARK

Sound, dense, high-strength parts available in cobalt-base alloys, nickel-base alloys, iron-base alloys, stainless steels, and alloy and carbon steel.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa

For more details circle No. 25 on Reader Service Postcard

SEE RUST-OLEUM APPLIED

DIRECTLY OVER RUSTED SURFACES!

SEE PROOF OF PERFORMANCE! MAKE

THIS TEST UNDER YOUR OWN CONDITIONS!

See Rust-Oleum 769 Damp-Proof Red Primer applied over a rusted surface after scraping and wire-brushing to remove rust scale and loose rust in the Rust-Oleum *"rusted panel demonstration."* Rust-Oleum's specially-processed fish oil vehicle *penetrates* rust to bare metal . . . saving time, money, and metal!

Beautify as you protect with colorful Rust-Oleum finish coatings. Specify Rust-Oleum for new construction, maintenance, and re-modeling. See Sweet's for complete catalog and nearest Rust-Oleum Industrial Distributor, or attach coupon to your business letterhead.

There Is Only One Rust-Oleum. It Is Distinctive as Your Own Fingerprint.

Protects Tanks, Girders, Gutters, Metal Sash, Fences, Roofs, Machinery, Stacks, Pipes, etc.

RUST-OLEUM®

STOPS RUST!

Resists Rain, Sun, Fumes, Snow, Heat, Salt Water, Salt Air, etc.

See local classified telephone directory under Rust Preventives or Paints for nearest Rust-Oleum Industrial Distributor.

ATTACH TO YOUR BUSINESS LETTERHEAD AND MAIL TO: Rust-Oleum Corporation, 2530 Oakton Street, Evanston, Illinois

- ☐ Please Show Me the Rust-Oleum "Rusted Paner Demonstration."
- ☐ Test Application of Rust-Oleum Over Rusted Metal Surfaces in My Plant.
- ☐ Complete Literature with Color Chart.
- ☐ Nearest Rust-Oleum Industrial Distributor.

Contact Your Nearest Rust-Oleum Distributor Today!

ARIZONA

Alemite Stewart-Warner
326 N. Third Avenue
Phoenix

CALIFORNIA

Barnes & Delaney
Atlantic & Willow Streets
Long Beach
Phone: Long Beach 4-1647

Ralphs-Pugh Co., Inc.
530 Howard Street
San Francisco

Republic Supply Co.
2600 S. Eastland Avenue
Los Angeles
Phone: Parkview 8-7151

Republic Supply Co.
1919 Williams Street
San Leandro
Phone: Lockhaven 2-0414

Sacramento Rubber Co.
721-723 "J" Street
Sacramento
Phone: Gilbert 2-3847

Valley Foundry & Mach. Works
2718 E. Avenue
Fresno
Phone: 3-6135

COLORADO

George Brothers
973 Broadway
Denver
Phone: Tabor 5-8747

Stickney's, Inc.
Ft. Morgan

Union Supply Company
1920 Market Street
Denver
Phone: Alpine 2091

IDAHO

Western Equipment Company
4009 Fairview Avenue
Boise

Western Equipment Company
Box 96
Idaho Falls

OREGON

Standard Supply Company
934 S.E. Sixth Street
Portland
Phone: Vermont 2167

UTAH

Williamsen Body & Equip. Co.
933 Wall Street
Ogden

Industrial Supply Company
121-135 Social Hall Avenue
Salt Lake City

WASHINGTON

E. H. Holm & Company
1016 First Avenue, S.
Seattle
Phone: Kenwood 5030

For more details circle No. 26 on Reader Service Postcard

call Ryerson for steel carbon, alloy, stainless

Quick delivery from world's largest stocks

Whether you need a single piece or a truckload you can depend on prompt, personal service from your nearby Ryerson plant. So, for every kind of steel—when you need it—call Ryerson.

RYERSON CERTIFIED STEELS

RYERSON STEEL

Principal products in stock: bars, structurals, plates, sheets, tubing, alloy & stainless steel, reinforcing, etc., also machinery & tools

JOSEPH T. RYERSON & SON, INC.

LOS ANGELES—Plant: 4310 E. Bandini Blvd. Mail: Box 3817, Los Angeles 54. Phones: ANgelus 2-6141, from San Diego, (no toll) ZEnith 6660.
SAN FRANCISCO—Plant: 65th & Hollis Sts., Emeryville. Mail: Box 188, Emeryville, California. Phones: OLympic 3-2933, ENterprise 1-0176.
SEATTLE—Plant: 1200 - 4th Ave. Mail: Box 3268, Seattle 14. Phone: SEneca 2300.
SPOKANE—Plant: North 207 Freya St. Mail: Box 2158, Spokane 10. Phone: KEystone 9311.

For more details circle No. 27 on Reader Service Postcard

Western Industry

NOVEMBER 1954

Training for maintenance

Here's a program that benefits both employees and management by upgrading the company's present personnel

By J. M. FORREST
Superintendent
Maintenance and Construction
The Dow Chemical Co.
Pittsburg, Calif.

IN eight years time our central maintenance group at Dow Chemical Co., Pittsburg, Calif., has jumped from 36 to 120 persons under a policy in which we firmly believe—that of upgrading our own employees.

This upgrading was handled in a carefully organized maintenance training program, set up to provide employees with the methods and techniques of carrying on the job of maintaining and operating our plant facilities. Results of our program show efficient economic operation in maintenance. In fact, the efficiency of the group has improved so markedly that we have had to reduce a number of our standard crews. This is not because the work has decreased, but because the manhour productivity has increased.

Among the benefits received from this program are: detailed job costs, manhour productivity data, and examples of well-handled emergency situations.

All employees who participate in this program and satisfactorily complete it advance to the top journeyman rate. This allows us to get to the core of the "two-man team" problem. We hope to eliminate two-man teams by having our supervisors assign each job to just the number of men which that job, on its own merits, requires.

In trained men, we believe we have the key to solving problems without suffering from the cost point of view. At the completion of training, our junior journeymen are not only qualified but want to perform high rated work. Very often failure to let them take this move results in dissatisfied workers and a refusal to do higher skilled jobs, in thought, if not in fact, on the part of junior journeymen. To answer the criticism that we have increased our wage bill, I would like to point out that the real cost is the total cost of the job and not how much is paid per hour.

Individual employees have benefited not only from the training itself but also from the confidence that comes with it. Furthermore, many of these journeymen continue to study on their own, using our technical library as well as other facilities.

We feel that our method of training has an advantage over general apprenticeship programs in that it is one developed for employees working in our particular plant. This program gives the craftsman overall training, because our plant is not dissimilar from other plants, but more important, the craftsman knows the way we want a job done while learning under the program. This is often very difficult to achieve.

Here's how it works . . .

The program, step by step:

OUR maintenance training program covers three broad areas:

1. Safe and proper use of hand and power tools.
2. Use of blueprints and bills of materials.
3. Necessary technical know-how, safety conduct, and plant standards to properly complete the job.

Every man entering any of the central shop groups is required to begin the program immediately. He enters the shop as a repair man, Class C, of his respective trade group, and at the lowest rate in that group. Training covers a 2½-year period consisting of five sessions of 23 lessons each, one lesson scheduled for each week. The extra weeks in the six months period are provided for vacations, sickness, absence, and make-up.

After the employee finishes the 2½-year course, he takes another 18 months of informal training conducted by the department superintendent in order to reach the top journeyman classification.

Instructors

Our company feels that any type of training ought to be conducted by the immediate supervisor of the group. Classrooms then provide a place not only for formal instruction but also for discussion of problems that may come up in the shop. In addition, the supervisor is able to evaluate field performance on the basis of what he has taught. Although training courses staffed by supervisors are not always possible, we feel they are so desirable that in a number of instances we have set up training programs for leadermen, crew leaders, sub-foremen, or assistant superintendents to qualify them as instructors.

Texts

Texts consist of a specially prepared manual applying specifically to the methods, equipment, and procedures used at our Pittsburg plant, plus any other handbooks selected by the training committee.

All texts and materials used in the course are kept by the trainee as a working reference library.

Classwork

Each lesson consists of a 2-hour supervised classroom period covering:

1. Discussion and reviewing of text and home problems handed in by the trainee at the start of the session.
2. A written examination based on the current lesson.
3. A study of the assigned text for the following week.

CLASS A carpenter using bandsaw. "Real cost is total cost of the job, not rate per hour," says author.

"This program requires the employee to get in and work toward a tangible reward, and it has teeth in it if he fails to do so."

A two-hour home study period is required, to be devoted to both the assigned text and the written problems given out at the close of the preceding class meeting.

Grading

The trainee's weekly grade is based on the weekly class problems (75%) and home problems (25%). Each trainee is given a grade for the six months period, based upon the average of all his weekly lesson grades. In order to continue the course, he must maintain a grade of 75% for the preceding six months period.

Job performance

In addition to his classroom work, each man is rated on his job performance. This rating is based upon job qualifications outlined in the training program. The man who fails to receive a satisfactory grade in either his classroom work or on-the-job performance for a six months period is removed from the department and released to the personnel department for reassignment.

Advancement

At the end of each six months period the trainee is advanced in rate. At the end of the full 2½-year program, it is necessary to take a qualifying examination given in two parts, written and manual demonstration. The written section is selected from the material previously covered in homework or classroom discussions and usually consists of 20 questions of equal rate, comprising 80% of the final grade. The manual demonstration entails five demonstrations, making up the final 20%.

Passing marks

A grade of 70% overall is considered a passing grade. Any man failing to pass the qualifying examination may take another after waiting six months. If he fails to pass this examination a second time, he is released to the personnel department for reassignment. This program requires the employee to get in and work toward a tangible reward, and it has teeth in it if he fails to do so.

Selection for jobs

Selection is handled in the same fashion for all jobs—by posting and job award. Anyone can "bid in" on a particular vacancy, but the decision is made by our four-man Job Award Committee. This committee is made up of two members representing management and two representing our union, the International Chemical Workers Union.

The Job Award Committee makes its selection after considering a number of factors. For placement in our machine shop, for instance, we have set up the following qualifications: maximum age 35 years; Class A physican condition; high school education or its equivalent; mechanical aptitude greater than the 75th percentile, as measured by the standard mental ability test; manual ability greater than the 75th percentile, as measured by the standard manual ability test; good personal qualifications, as noted on the merit rating sheet by his current supervisor; and length of service or senority.

Program supervision

Overall supervision of our training program is the responsibility of the Training Committee, consisting of four people. There are two permanent members, one each from the company and the union, and two temporarily appointed by the company and the union. These come from the particular department in which the training program is being conducted. It is the responsibility of this Training Committee to supervise the development of the regular program and to establish and administer it.

The program is more than 90% complete at the present time and will be 100%, for all practical purposes, within the next year.

This article is based on a talk given by Mr. Forrest at the Western Plant Maintenance Conference in Los Angeles.

RIGGER GUIDES hoisting of an evaporator. General format of training courses was developed by N. C. Ross, division chief engineer, assisted by Tony Julio. Union at first skeptical, now thoroughly in favor.

Electronics boom hits New Mexico

Birthplace of nuclear weapons, test center for guided missiles, technical and artisan labor supply make this area a natural

WHEN scientists pushed the button to set off the world's first atomic bomb in July 1945, they set up a chain reaction that has revolutionized the economy of New Mexico, fourth largest state with the fourth smallest population. The new addition to a state that had previously counted on cattle and tourists for its revenue is a flourishing electronics industry.

Electronics manufacturing is an ideal type of industry for New Mexico because it doesn't call for the use of scarce resources such as water and doesn't involve heavy shipments of raw materials in and finished goods out. Distance from market is not much of a handicap where you deal in items worth hundreds of dollars that you could put in your vest pocket.

Today, New Mexico has more technical and professional research workers per capita than any other state in the union excepting Maryland, home of the DuPont enterprises. There are perhaps 1,000 electrical engineers alone.

Other New Mexico advantages for such industry are: mild climate, unusual recreational surroundings, and a native population made up of persons of Spanish descent and the Indians, clever with their hands and strictly non-migratory.

Points of origin

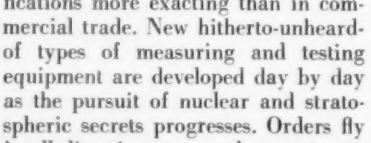
At Los Alamos, birthplace of ideas for nuclear weapons; at Sandia Laboratory (Albuquerque), where ideas turn into actual weapons; at Kirtland Air Force Base (Albuquerque), where pilots and planes are conditioned to the Special Weapons program; at White Sands Proving Grounds, where stratospheric rockets are tested; at Holloman Air Force Base (Alamogordo), where guided missiles are the business—thousands of scientists and highly trained technical personnel recruited from all parts of the country, and some foreign countries, are busy keeping the United States ahead of the field in this new era of fantastic weapons.

Albuquerque is a convenient supply center for all of these installations and is the headquarters of Santa Fe Operations, which directs all A-bomb activity for the AEC, from pure research to Eniwetok.

The attendant construction and gilt-edged payrolls involved in these various programs have doubled New Mexico's per capita income, boomed real estate, and made a metropolitan city of Albuquerque.

The kind of research going on consumes large quantities of material, machinery, and made-to-order items, many of which must conform to specifications more exacting than in commercial trade. New hitherto-unheard-of types of measuring and testing equipment are developed day by day as the pursuit of nuclear and stratospheric secrets progresses. Orders fly in all directions across the country to vendors who can produce devices as complicated as the research they are intended to serve.

COSMIC NOISE recording machine under test at Crown Engineering Co. plant in Albuquerque.



Such an inviting market has created a vacuum of demand over supply. This has happened in a non-industrial area where, prior to World War II, a tool and die shop couldn't make a living, and machine shops were concerned with automotive and mining machinery jobs. Response has been slow and tentative. No one knew how long the bonanza would last. Precision skills were scarce. But the foundations were laid for important factor production, especially in electronics. A dozen firms at Albuquerque are now making precision electronics parts or complete assemblies. A few are branching out into finished products of their own, working up national markets.

One of the first Albuquerque firms to take advantage of the new opportunity was Crown Engineering, a small television service company. After making good on orders for the AEC and its contractors, this company began selling electronic items to the regular trade.

Dale Products, a Columbus, Neb., concern specializing in precision electronic equipment for the AEC and large aircraft manufacturers, established a branch plant in Albuquerque in 1953. Its AEC business increased several-fold as a result of getting its production closer to purchasing departments. Direct contact with manufacturers often helps to solve problems of design and fabrication.

Dale's facilities made it possible for King Electronics Co., a new Albuquerque enterprise, to farm out its product, the Whitlow UHF Alarm, (see WESTERN INDUSTRY, May 1954.) and concentrate on setting up national distribution.

Several of the new enterprises now serving the research market in New Mexico have been started by engineers who have put in a tour of duty at one or another of the research projects in the state. They are cashing in on their first-hand knowledge of what the purchasing departments want and

are generally facilitating the whole program.

One of these is Ultradyne Engineering Laboratories, Inc., at Albuquerque, now turning out a pressure transducer. It's a small instrument about the size of a match book that transforms pressure into electrical current. Main applications are for altitude drops, ram pressures, wind tunnel turbulence studies, surface pressures on airfoils, shock tube studies, and blast wave pressures.

Bob Johnson and Pete Church left Sandia Laboratory to manufacture this instrument. They also make the Ultradyne Radio Code Machine, a device of their own like a small table phonograph, designed for radiotelegraph code practice. It produces signals at any desired speed from practice tapes run through a photoelectric mechanism. The machine is leased through radio jobbers to radio schools, reserve military units, ham radio operators, and others interested in teaching or learning the radio code.

After several months in a small garage shop, Ultradyne has moved into larger quarters in the basement of a sizeable building.

Other expansions

CG Electronics Corporation got its start in Albuquerque as a distributor of pressure transducers — one of the ten or fifteen factory representatives located in Albuquerque to contact buyers at research projects. The company was formed when Harold L. Poulsen, a salesman, joined Frank A. Hoover, who left a job with Sandia Laboratory. They are manufacturing a product of their own, a transmitter-receiver unit for remote control of model aircraft in flight.

This firm outgrew its new cement-block plant in a few months and is building additional floor space.

Walter F. Hardgrave Co., of Albuquerque, finds markets for instrument stations, backs for testing benches, and control systems for industrial plants.

At Santa Fe, between Los Alamos and Albuquerque, Howard Eberline has established the Eberline Division of Reynolds Electrical Manufacturing Co., to specialize in electronic instrumentation. Mr. Eberline is another of the young engineers who held a research job before going into business for himself. He was employed at the Los Alamos Scientific Laboratory.

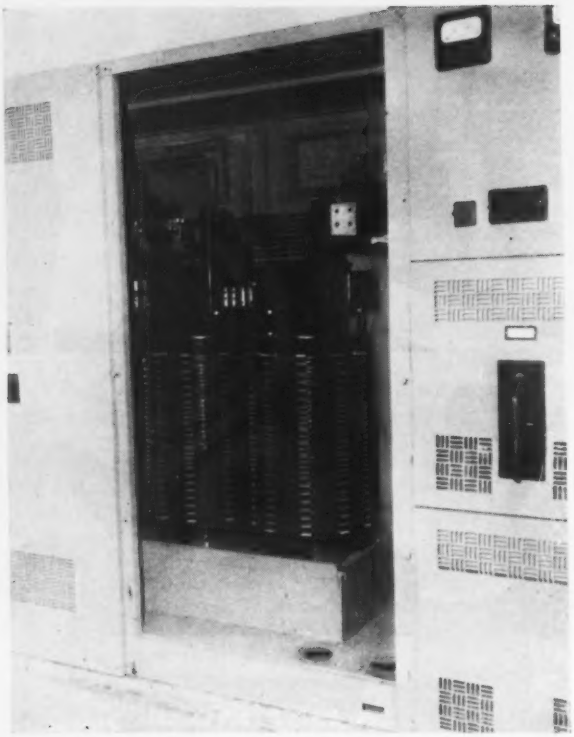
These are small beginnings, but they show what can happen where plenty of know-how and a specialized market are brought together.

JOHNSON and Church of Ultradyne left Sandia to make electronic instruments.

INSPECTING their press-transducers. They also manufacture radio code machines.

FRANK A. HOOVER, also from Sandia, watches assembly of receiver units at CG Electronics.

PACKAGING model aircraft transmitter-receiver units at the CG plant in Albuquerque.



750-KVA. air-cooled transformer with side sheets removed.

Care of transformers

Care for them and they'll care for you. Guide for scheduled maintenance of ventilated dry type and liquid filled.

By PHILMORE BELSKY
Switchgear Product Engineer
Westinghouse Electric Corp.
Los Angeles

DRY type and liquid filled transformers are designed for long life with a minimum of maintenance. But there is no assurance that they will stay faithfully on the job unless a program of scheduled field maintenance is set up to look after them. The brief descriptions and recommendations that follow are given as a guide to such preventative maintenance program for normal operation.

Dry type transformers

A maintenance schedule for dry type transformers, like other electrical apparatus, depends upon existing operating conditions. For dry clean areas, inspection once a year may be sufficient. Contaminated atmospheres may necessitate maintenance every few months. After the first few inspections a definite schedule can be determined to suit individual installations.

With the transformer de-energized and side panels removed, inspect for dirt on the insulating surfaces and in air ducts. Connections should be checked for tightness and a sharp lookout kept for signs of overheating or voltage creepage over insulating surfaces, shown by tracking or carbonization.

Dirt may be removed from the windings with a vacuum cleaner, a blower, compressed air, or even nitrogen. Compressed air or nitrogen should be clean and dry, and applied at a pressure not to exceed 25 psi. The use of the vacuum cleaner is preferred for large areas. Dirt may be blown from inaccessible parts with a blower or compressed air, but the dirt will scatter and settle on other parts, from which it must be removed.

Insulation tests should be made before placing a transformer in service, to be sure it is in satisfactory operating condition and to obtain data for future records. Variable factors of temperature and humidity make it difficult to set insulation resistance limits. However, an approximate value of 2 megohms per 1000 volt of nameplate voltage rating is satisfactory but in no case less than 2 megohms total (1 minute reading at approximately 25 deg. C.) Occasionally a high potential test is made when major revamp or repair is performed on the transformer to verify satisfactory operation. These test values are as follows for a one-minute interval:

Insulation class (kv.)	Test voltage (kv.)
1.2	3
5.0	9
8.66	14
15.0	23

If desired, additional tes's can be performed to check ratio and polarity and to determine winding resistance. This information can be useful as a guide in checking a transformer over a period of years or following repair work.

If the transformer has been subjected to unusually damp conditions, it should be dried out before placing in service. Humidity conditions are not important as long as the transformer is energized. If a shutdown period occurs during a condition of high humidity, which can cause condensation within the transformer housing, then strip heaters should be placed in the bottom of the unit after shutdown to maintain a temperature inside the transformer case several degrees above outside ambient.

When it is necessary to dry out an air cooled transformer, there are three standard methods which may be used: (1) external heat, (2) internal heat, (3) external and internal heat. The third method is by far the quickest. It is recommended that the winding temperature not be permitted to exceed 100 deg C. as measured by resistance or by thermometers placed in the ducts between the windings.

Measure insulation resistance to determine the status of drying. Measurements should be taken at 2-hr. intervals. Beacuse insulation resistance varies inversely with temperature, the transformer temperature should be kept approximately constant during the drying period to obtain proper readings. As the transformer is heated,

a rapid drop in resistance measurement will probably occur due to the presence of moisture, followed again by a gradual increase, until near the end of the drying period it will increase quite rapidly.

A curve should be plotted of the time and resistance until the resistance remains constant for about 3 or 4 hours. The insulation resistance measurement should be taken for each winding to ground, with all windings grounded except the one being tested. Be sure to ground and short circuit any winding to be measured to drain off possible static charge.

Air cooled transformers are often applied in combination with primary air switches with or without power fuses. Such switches can be obtained either for magnetizing or load break operation and should be inspected and cleaned at regular intervals. Interrupter parts should be checked for tightness and erosion. This type of switch has a limited life under full load interruption and may at times require replacement of arcinterrupting details if subjected to unusual switching service.

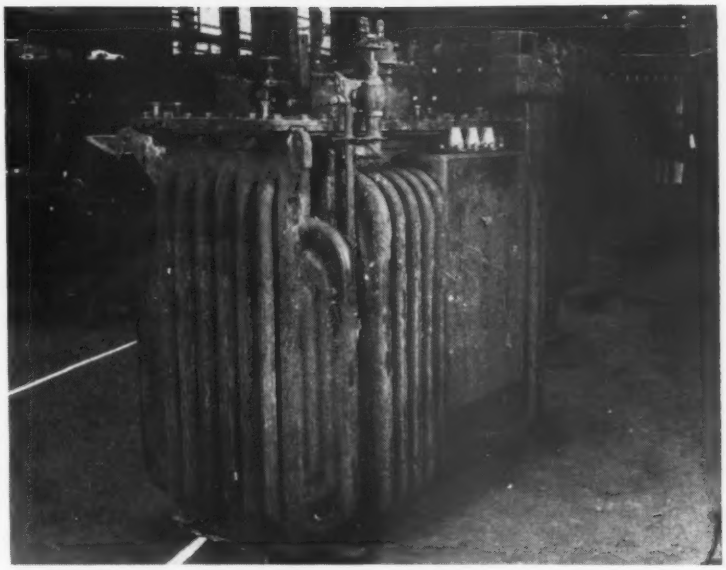
Liquid filled transformers

In general liquid filled transformers, whether oil or askeral-type, will require inspection to determine whether there are any conditions indicating the entrance of moisture either prior to energizing or while in service. Samples of the insulating liquid taken from the transformer case should have a dielectric strength of 26 kv., although this value can vary somewhat without danger to the equipment. If the liquid shows a dielectric strength of less than 22 kv. it should be reconditioned. Oil samples should be procurred from the bottom of the tank, while askeral samples should be taken from the top, because of the difference in specific gravity.

Caution must be used in handling askeral-type liquids because they are skin irritants. Unnecessary contact should be avoided, particularly when hot.

Oil will mix readily with askeral-type liquids and it is almost impossible to separate them. Avoid such contamination since it changes the latter's non-inflammable characteristics. Likewise a filter press used for askeral-type liquid reconditioning should not be used to handle oil or other materials because of the possibility of contamination.

The method of testing either insulating liquid has been standardized by the American Society for Testing Materials. This is a subject on which much time and effort has been spent. Complete details on the testing equipment and instructions for its use are available on request from the suppliers of liquid filled transformers.



THIS IS WHAT neglect of a preventive maintenance program will do. Subway-type oil insulated transformer showing tank condition after prolonged operation without maintenance.

Since the successful operation of liquid filled transformers upon the condition of the insulating liquid, the utmost care must be exercised in keeping the liquid clean not only when filling the transformer tanks but whenever the tanks might be opened for inspection.

Containers of insulating liquid must be allowed to reach room temperature to prevent condensation of moisture which may mix with the liquid when pouring.

Never use askeral-type liquids in a transformer designed for oil insulation since it acts as a solvent on most varnishes and paints used in an oil transformer.

Modern liquid filled power transformers are so designed that there is little possibility of the transformer breathing during its normal load cycle and therefore the insulating liquid should not be exposed to moisture or oxygen in the air. A thorough inspection, therefore, which would entail opening the tank for inspection of internal parts, is necessary only infrequently, if at all, unless there are specific indications of trouble. Normal maintenance procedures for cleaning cooling surfaces and mechanical parts, together with periodic insulating liquid dielectric tests for average loads and service, should be adequate.

Many applications for liquid filled transformers in distribution systems involve the use of primary switches mounted adjacent to the transformer as isolating disconnects, or combined with power fuses in load break or magnetizing break switching. Generally speaking, liquid filled switches are used with liquid filled transformers and are interlocked to break magnetizing currents only. The insulating liquid in the switch requires the same periodic dielectric test procedure recommended for the transformer itself, and the same precautions must be observed.

The mechanical parts of the liquid filled switch itself should require little attention in normal operation, since the switch will be used infrequently to break magnetizing currents only. Air insulated switches with or without power fuses will require inspection and maintenance as described previously.

Many of the tests and procedures outlined require special apparatus which can be purchased or fabricated to suit the requirements of every installation. However, most manufacturers of switchgear and transformer equipment maintain local facilities and personnel which, together with test apparatus, are available for use under the supervision of competent electrical service engineers.

The above article is adapted from a talk delivered before the Western Plant Maintenance Conference, held recently in Los Angeles.

Technician or engineer?

Cal Poly and Utah State attempt to bridge the gap with curricula designed to meet today's engineering demands.

TWO progressive engineering schools in the West are making a concerted effort to bridge the gap between the machinist and the engineering supervisor.

California Polytechnic at San Luis Obispo, Calif., and Utah State Agricultural College at Logan, Utah, have tempered their approach to engineering curricula in an effort to turn out capable engineers able to take up the tools of the trade as well as direct and do research, sales, production, and specialist jobs.

Graduates of both schools have done particularly well and are demonstrating their versatility in a number of fields related to engineering, if the increasing yearly demand from industry is a reliable indicator. Although these two schools aim at the same end result, their plans of attack are quite different.

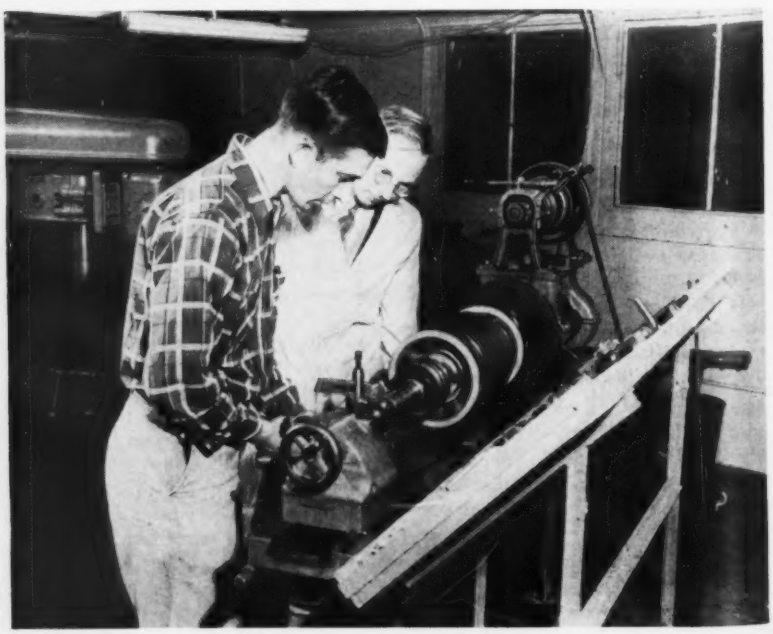
Cal Poly begins engineering studies in the student's freshman year, giving him more experience with the tools at his disposal and allowing immediate application of such courses as mathematics and engineering, taken concurrently. It also gives him partial training if he is unable to finish out his four years.

Utah State, on the other hand, divides its school into an engineering division and a technology division. The engineering curriculum follows the conventional pattern but includes a series of courses in operations and processes rather than unrelated engineering work.

Cal Poly emphasizes its "learn by doing" program, maintaining that nothing is really learned until the student, working under supervision, can do the job by himself. Utah State's technology curriculum provides students having a keen aptitude for mechanics, and less ability in mathematics and academic engineering, a chance to earn a B.S. degree in Industrial Technology. This program

LEFT: CAL POLY aeronautics engineers learn about aircraft from the ground up. Aircraft engineering major replaces parts on wing.

BELOW: ELECTRICAL ENGINEERING major turns a shaft in the repair of a slip-ring type motor in Cal Poly's shop.



complements the program of the engineering division in providing men trained to fill the gap between the machinist and the supervising engineer.

Harold P. Hayes, dean of engineering at Cal Poly, maintains that his school's approach is not a new one but simply occupies a field which the more traditional engineering colleges have vacated. It is based on the need for engineers—particularly in production, sales, and service—who know how to apply research efficiently and can speak the language and share insight into the problems of the production worker or craftsman.

Cal Poly's program follows an upside-down approach in that students start to take engineering subjects in their first quarter and consequently grow up with the subject. There are three general reasons for this policy. (1) A young man makes a better engineer if he has been an engineer for four years rather than two. (2) Experience indicates that if a young man is taking a related course, such as mathematics, and at the same time can apply that mathematics to his field of real interest, he will do better at both. (3) If a student is forced to leave before has completed the full course, he still has some engineering training to justify his expense to the taxpayers.

Technical courses consume 19% of the student's class time and are concentrated in the first two years. They train him in the use of established procedures and operations for development of skills and understandings basic to engineering, such as surveying, welding, and drafting. Engineering courses, stressing the application of basic laws to useful situations, comprise around 29% of this work and are concentrated on the last three years. Scientific courses constitute about 27% and are concentrated during the first three years. They are designed to provide a foundation of scientific fact and training in the use of basic mathematical and scientific tools.

Studies rounded

Humanistic-social courses are distributed throughout the four years and take up about 18% of the student's time. The remainder of the work leading to a B.S. degree is elective, and engineering majors are encouraged to participate actively in campus affairs, even while carrying the heaviest program on the campus.

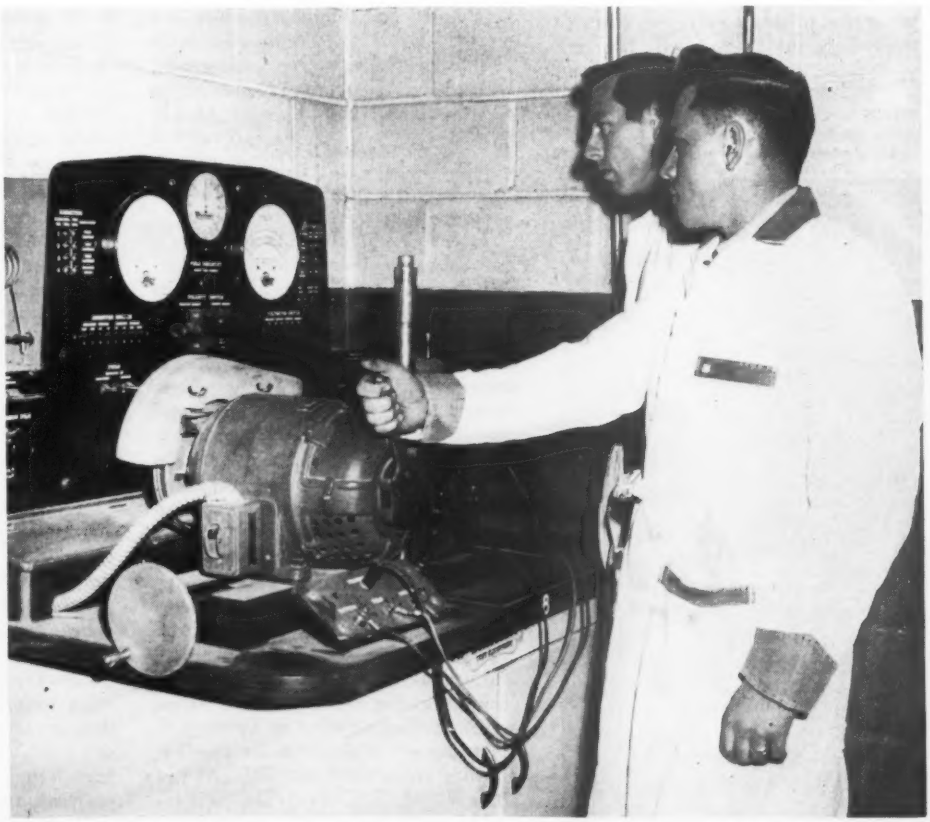
Radio and electronics majors operate a campus repair shop started by funds loaned by the college foundation, and students are encouraged to earn while learning, on the basis that one of the greatest incentives toward interest is some quick tangible profits. It is not unusual for young engineers in search of money to further their training by buying and repairing crashed-up airplanes for resale.

Architectural engineering students frequently plan and supervise construction of smaller homes, business and civic buildings. A group of senior students recently finished the development of a complete master plan for the city of Morro Bay near San Luis Obispo, Calif.

The college's hydraulic laboratory and much of the equipment in the electrical and air-conditioning labs was built by mechanical engineering students, and students in the welding department are just completing a portable boxing and wrestling ring that can be transformed into a stage or bandstand.

The dean of engineering maintains that under the stress of today's situation, the field of service engineering is being deserted and training is leaning too much toward research and development work.

There is no longer time for large companies to train inexperienced graduates and mold them into the neces-



UTAH STATE automotive technology students using generator testing equipment.

sary pattern. In today's market, there is not only limited time for training, but limited capital for smaller firms to pay for this training. A look at the future indicates that there will be an increasing need for men to produce, operate and maintain machines.

Cooperation with industry is evidenced by the work that has been done with Standard Oil in the study of defective welds on its new Boise-Salt Lake pipeline, and work and flow studies which have been handled for the printing industry.

As a result of the college's training program, recent graduates have become successful sales representatives, production managers, government engineers, test specialists, research scientists, and specialists in many other fields.

Utah State

Utah State Agricultural College has also been conscious of the widening gap between the professional engineer and the production worker. It has attempted to fill the gap by providing two distinct courses of study in its school of engineering: a technology division and an engineering division.

The engineering division of the school offers conventional engineering curricula in the fields of agricultural, civil, electrical, and tool engineering. The technology division specializes in programs in aeronautics, automotive technology, welding, woodwork, and building construction. These programs of study lead to the degree of B.S. in Industrial Technology.

WELDING class at Utah State, part of school's industrial technology program.

Tool engineering follows the conventional pattern, but does include a well-planned series of courses in machine tool operations and processes designed to bridge the gap between machinists and engineers. These are made possible by eliminating such courses as heat power engineering which have little relation to production engineering work.

Technology

Technology curricula have the following elements in common:

1. A third of the student's time is devoted to specialized shop work during his first two years. Usually the student registers for 6 credit hours in his department, the remainder of his time being spent in English, mathematics, engineering drawing, chemistry, physics, economics, and general education courses.

2. The technology curricula do not include calculus or other advanced mathematics unless taken as an elective.

3. Technology curricula contain about the same amount of chemistry and physics as conventional engineering curricula.

4. All curricula contain as much, and usually more, emphasis on engineering drawing as conventional engineering curricula.

5. Engineering mechanics and hydraulics are usually not included but applied work in thermodynamics is included in some of the curricula.

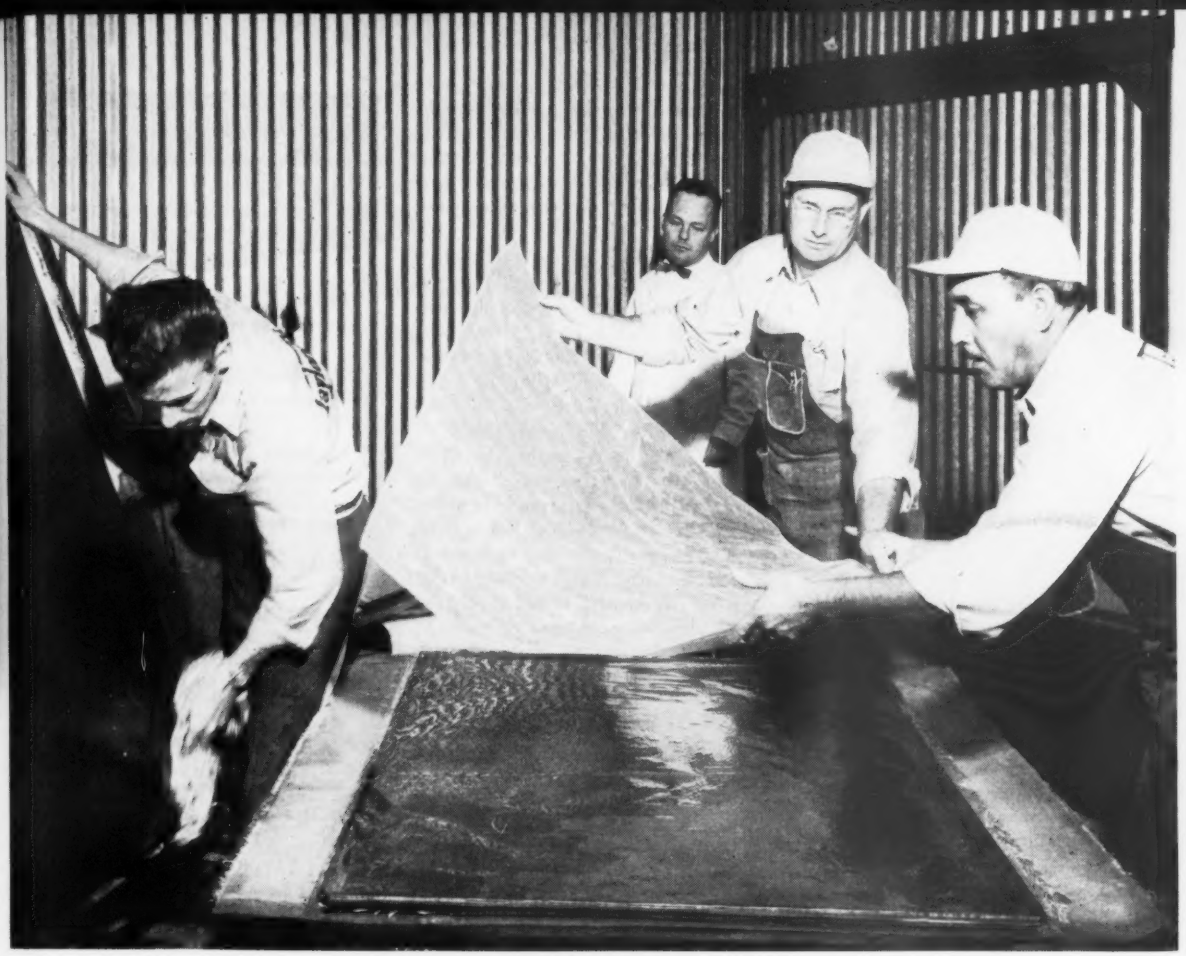
6. Technology curricula include courses in business administration, shop courses in related fields, and advanced work in the student's major subject.

The intent of this course is a good balance between vocational objective, basic science, and general education. Graduates have been highly successful in a wide range of jobs because they are better trained as mechanics and, for the practical work to be done, are more useful than conventional engineering graduates.

Although many engineering deans wonder how this type of program can be successfully conducted parallel to the more conventional engineering curricula, Utah State has found the course attractive to students who have a keen aptitude for mechanics and those who like to do things with their hands but who do not have an interest in or an aptitude for higher mathematics.

Engineering students who learn by the end of the freshman year that they do not have the aptitude or ability for professional engineering can transfer to a technology department and complete the remainder of their program without loss of time. The college believes that there is considerable need for training beyond the high school level in all fields covered by a technology department, a need they are trying to fill through a course of study specifically designed to breach the gap between machinist and engineering supervisor.

BENCH in Cal Poly's electronic service shop, where students repair more than 1,000 electronic devices a year at a profit.



ELECTROLYTE copper with Epon adhesive on one side receives several layers of Epon-impregnated glass cloth, at Taylor Fibre Co., LaVerne, Calif.

Epoxy resins

. . . a versatile, resistant new plastic with a wealth of Western uses

EPOXY synthetic resins, a new class of condensation polymers, have achieved rapid acceptance because of their unusual resistance to chemical and corrosive attack, their improved physical properties and ready modification with certain other synthetic resins.

Shell Chemical Co., whose epoxy resin bears the registered trademark of "Epon," have recently tripled their Western capacity for this product, to meet growing demand from paint formulators, manufacturers of adhesives, lamine fabricators, and plastics tool and die makers.

One of the most outstanding applications of an Epon resin protective coating is at the Santa Monica plant of Douglas Aircraft Co., Inc. After this plant adopted Skydrol hydraulic fluid as a pressure transfer medium for hydraulic systems and cabin superchargers, it was found that a new protective coating was needed in the exhaust path areas of the nacelles and fuselage. Conventional paints were not compatible with the hydraulic fluid. In addition, these areas were subject to corrosive attack by lead halide deposits resulting from the use of higher octane aviation fuels.

Accordingly, the company asked major paint companies to start development work on a new protective coating. Among the requirements were:

1. **Complete resistance to Skydrol synthetic hydraulic fluid.**
2. **Resistance to temperatures up to 300° F.**
3. **Resistance to the strong cleaning agents used in removing exhaust deposits.**
4. **Resistance to wind and rain erosion on aircraft traveling at 300-400 mph.**

During the past four years over 300 paint formulations were submitted, including paints based on such resins as alkyd, phenolic, vinyl, silicone, chlorinated rubber, cellulose nitrate, cellulose acetate, polyvinyl-butyral, nylon, neoprene, urea formaldehyde, Epon resin, and many of their modifications.

In 1951 Douglas tested a catalyst-cured Epon resin coating formulated by Finch Paint & Chemical Co. of Torrance, Calif., and a solution was in sight. The coating had good resistance to Skydrol, but problems in flow, water resistance, and appearance were still to be overcome. Since the tests had demonstrated that the primer, too, must be resistant, Finch submitted in 1952 a primer and a top coat, both based on Epon resin and cured with

APPLICATION of Cat-A-Lac paint to Douglas DC-6B plane at Santa Monica, Calif.

an amine catalyst. Both coatings were room-temperature air-dry systems which resisted Skydrol, had good adhesion, and exhibited high gloss in all colors. Considerable time and effort was expended after this first promising formulation, and further improvements in water resistance properties were made. In July 1953 the Finch "Cat-A-Lac" coating was officially adopted for critical corrosion areas on Douglas aircraft. A light gray with high gloss, blending well with the adjacent aluminum surfaces, was specified.

Aircraft application

All DC-6, DC-6B, and DC-7 airplanes now receive this Epon-based primer and top coat on the exhaust path areas of all four nacelles and on the two heater exhaust patterns on the fuselage. Proof of its adhesion, corrosion resistance, and durability is provided by one airline which reports that the coating is still intact after some 1,200 air hours.

A coating system with such a high degree of resistance can be used to advantage in fields other than aircraft. The washing machine industry is a big user of epoxy resin based finishes because of their resistance to chemical and detergent attack.

Westinghouse Electric Corp., for example, evaluated many prime coat paints under accelerated tests for humidity, salt spray, and detergent resistance. Test results showed that the epoxy primer, modified with urea, gave three times the protection with only one-third the film thickness of the paint used previously. Here the proper combination of the epoxy resin with urea resin provided a paint of superior film characteristics.

When this system was combined with automatic rotary flow coating, the manhours needed were also substantially reduced. Thus, there was a saving in materials, increased productivity, and a certainty that the Laundromat would endure even outdoor storage conditions in humid areas.

A one-coat epoxy-amine finish to combat the corrosive conditions encountered in industrial and domestic evaporative coolers is also being used. Product appearance has been improved, and the finish so tough that parts can often be handled on the assembly line without fear of damage, previously the cause for considerable reworking and refinishing time.

Use expands

Use of the new type of prime and finish coat is spreading throughout the appliance industry and now includes refrigerators, dish washers, and ranges. In fact, epoxy coatings are moving into many other fields, such as finishing silo equipment exposed to corrosive ensilage acids, coating steel measuring tape that outlasts chrome-plating, and coating air rifle barrels, metal lawn furniture, and incubators.

Other uses for epoxy based paints are in plant and equipment maintenance. Here, the resistance of these paints to attack from acids, alkalis, and solvents is reducing repainting requirements and effecting proportionate savings in maintenance manhours.

An epoxy-amine air-dry paint system is also being applied, in areas where solvent spillage occurs, to structural steel beams, stairways, processing vessels, storage tanks, and motors. A three-coat epoxy system is used, the first being a red lead, the second a medium gray, and the third a coat of high gloss light gray. A high gloss white is the finish coat on solvent tanks exposed to heat or sun.

Coatings show no signs of failure after a year and a half of exposure to corrosive agents which caused previous coatings to break down after a few months. These agents include fumes of hydrogen chloride, sulphuric acid, free chlorine, benzene hexachloride, lindane, and DDT, plus solvent spillage and heat.

This paint promises considerable reduction in maintenance costs in marine applications, and outdoor storage tanks are being coated with the

FOR COPPER AND BRASS MILL PRODUCTS SEE THESE

REVERE DISTRIBUTORS

ON THE PACIFIC COAST

AMERICAN STEEL WAREHOUSE CO.
425 N. E. Ninth Avenue, Portland 14, Oregon
Phone: EAst 9111

AMERICAN STEEL & SUPPLY CO.
44 & 51 E. 7th St., Eugene, Oregon
Phone: 4-6291; 5-4126

EAGLE METALS COMPANY
4755 First Ave. South, Seattle 4, Washington
Phone: LAnder 9974

Helena at Broadway, Spokane 24, Washington
Phone: KEystone 0586

2336 North Randolph, Portland 12, Oregon
Phone: TUxedo 5201

PACIFIC METALS CO., LTD.
1400 So. Alameda St., Los Angeles 21, Calif.
Phone: PR 0171

3100—19th Street, San Francisco 10, Calif.
Phone: Mission 7-1104

261 W. 5th South St., Salt Lake City 4, Utah
Phone: 22-3461

19 No. 4th Street, Phoenix, Arizona
Phone: ALpine 4-0369

1533 India Street, San Diego, Calif.
Phone: FRanklin 9-5826

TAY-HOLBROOK, INC.
603 Brown St., Bakersfield, Calif
Phone: BA 5-1221

940 Broadway, Eureka, Calif.
Phone: HI 2-4516

920 "M" Street, Fresno 18, Calif.
Phone: 6-8231

900 Alice Street, Oakland 7, Calif.
Phone: TE-2-4200

1801—22nd Street, Sacramento 4, Calif.
Phone: HI 6-3841

P. O. Box 969, Salinas, Calif.
Phone: 2-4771

605 Old County Road, San Carlos, Calif.
Phone LY 3-7631

165—8th Street, San Francisco 1, Calif.
Phone: MA 1-6800

695 Stockton Avenue, San Jose, Calif.
Phone: CY 2-3606

251 Roberts Avenue, Santa Rosa, Calif.
Phone: S.R. 6400

1234 So. Aurora Street, Stockton 8, Calif.
Phone 4-4841

●

UNION HARDWARE & METAL CO.
5555 E. Ferguson Avenue
P. O. Box 3070, Terminal Annex
Los Angeles 54, Calif.
Phone: RAymond 3-2411

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

• • •

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

• • •

LOS ANGELES: 6500 East Slauson Ave. Raymond 3-3331; SAN FRANCISCO: 116 New Montgomery St. Sutter 1-0282; SEATTLE: 1331 Third Ave. Main 1401

PERHAPS YOU, TOO, CAN MAKE A BETTER PRODUCT WITH REVERE EXTRUDED SHAPES

This new Oxy-Acetylene welding torch is notable for the use of Revere Extruded Shapes in free-cutting brass—and also for its light weight, good balance, and easy handling. The connection for the gas tubes is machined from a shape, and silver-brazed to the fluted handle, also a shape, which is in turn brazed to a shape that contains the needle valve controls. Another fluted shape is the mixer, and the same shape is also the source of the next part, which is a second mixer. Another shape forms the nut which attaches the nozzle to the assembly. The nozzle, by the way, is made of Revere Free-Cutting Copper Rod, which is upset, drilled, swaged to size, and then chrome plated. The manufacturer of this new torch came to Revere to learn about the possibilities of extruded shapes.

If you have a product whose design includes a part or parts calling for extensive machining along the longitudinal axis, such as flutings, curves, recesses, remember Revere Extruded Shapes. They can greatly reduce machining time, lessen scrap, lower production costs, and speed up output. See the nearest Revere Sales Office.

REVERE

COPPER AND BRASS INCORPORATED

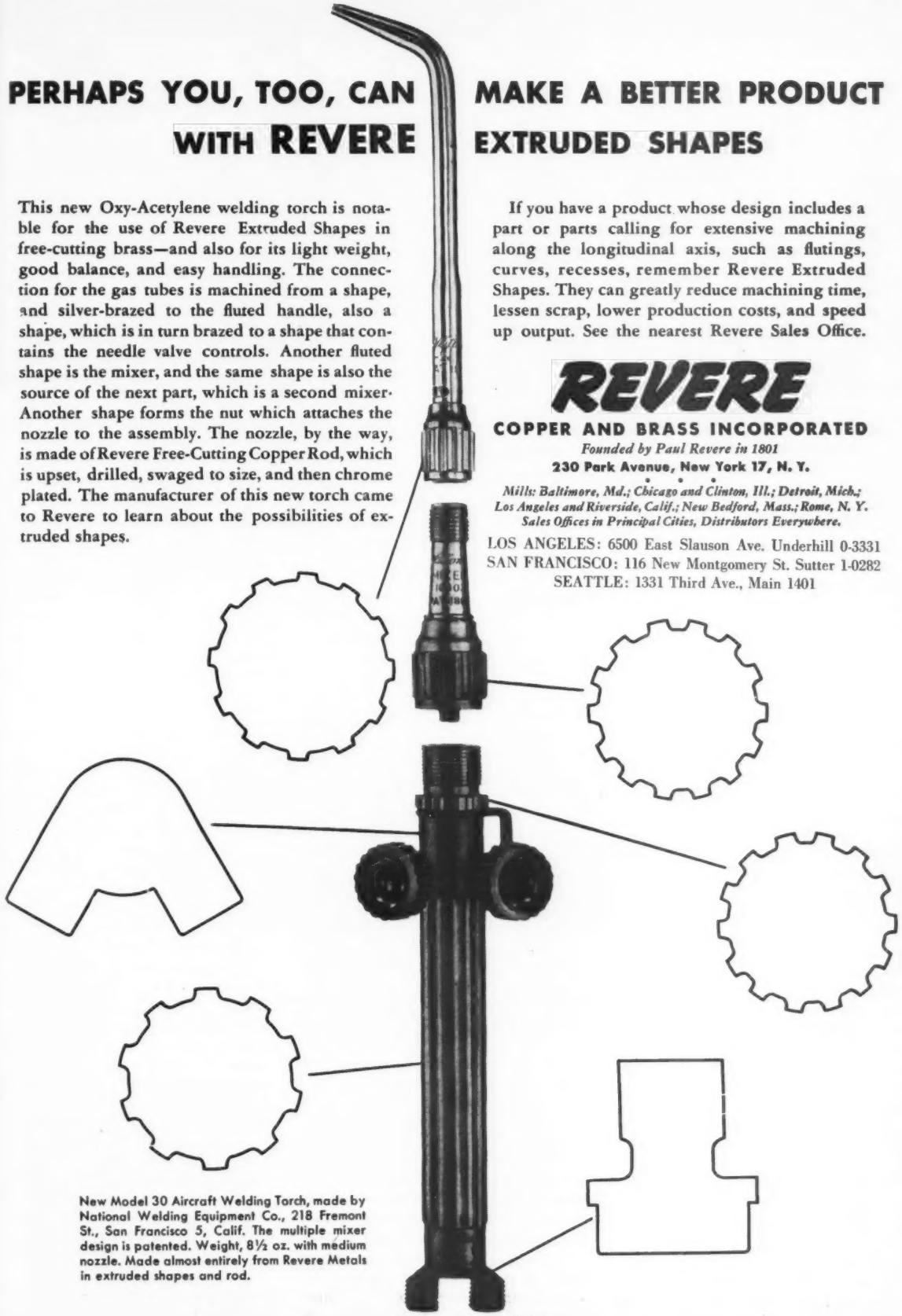
Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

• • •

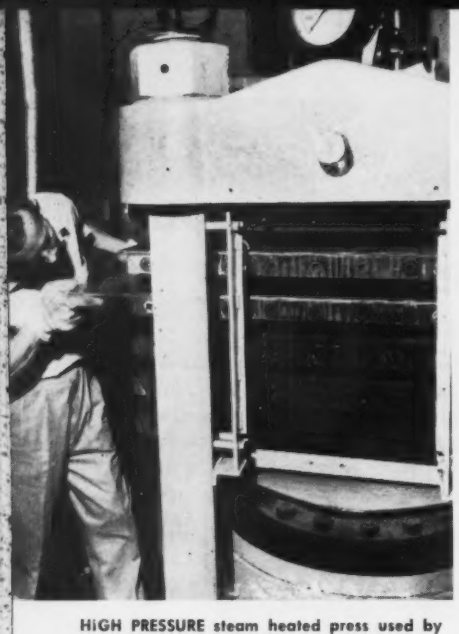
Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

LOS ANGELES: 6500 East Slauson Ave. Underhill 0-3331
SAN FRANCISCO: 116 New Montgomery St. Sutter 1-0282
SEATTLE: 1331 Third Ave., Main 1401



New Model 30 Aircraft Welding Torch, made by National Welding Equipment Co., 218 Fremont St., San Francisco 5, Calif. The multiple mixer design is patented. Weight, 8½ oz. with medium nozzle. Made almost entirely from Revere Metals in extruded shapes and rod.

For more details circle No. 28 on Reader Service Postcard



HIGH PRESSURE steam heated press used by Mica Corp. for manufacture of Epon laminates.

COMPLICATED jet airframe parts, practically free of wrinkles, being formed by drop hammer in Epon resin surfaced dies at Lockheed. Dies are made faster, cheaper, without machining.

same type of epoxy paint for much the same purpose—to lengthen intervals between repainting and maintain high reflectivity.

Another application for epoxy resins is in protective linings for steel tank cars, drums, and containers handling and transporting liquid latex, solvents, and chemicals of high alkalinity. These epoxy resin coatings are of the baking type and are applied on both a single and multiple coat basis, depending on the end use made of the product.

A substantial volume of epoxy resins is now going into the can manufacturing industry, where its excellent scorch resistance and adhesive properties are a distinct advantage in precoated forming operations. At the present time the brewing industry is the major customer for Epon lined cans. Other industries are evaluating epoxy can coating formulations.

Epoxy resins are widely used in adhesives, laminates, casting and potting resins, and also for the fabrication of tools and forming dies. Chemical resistance, good electrical properties, excellent adhesion, impact strength, and dimensional stability are among the chief advantages of epoxy resins in these applications.

Epon laminating resins are being used by such companies as Plastilight, Inc., Taylor Fibre Corp., and The Mica Corporation in California in producing copper-glass laminates for the manufacture of printed electronic circuits, considered to be the most dimensionally stable type available on a commercial basis.

In this application, the Epon resin exhibits such excellent adhesive properties that no secondary adhesive medium is needed to bond the copper to the laminate, thereby eliminating an operation. The extremely low water absorption of the laminate assures the maintenance of the original superior electrical properties. Machinability rating in punching, sawing, drilling, and shearing is considered to be better than with any other glass laminate.

Structural laminates made with epoxy resin are the subject of considerable experimental and field testing in both commercial and classified military applications. Epoxy laminated products now on the market include crude oil storage tanks, propeller cuff cover plates, chemical and laundry bleach tanks, and even fishing rods. They all show better dimensional stability and chemical resistance than do products made from conventional materials.

Shell sells Epon Adhesive VI and Epon Adhesive VIII, formulated especially for the aircraft industry, and supplies Epon resins to national adhesives manufacturers for custom formulation. Metal-to-metal bonding is one of the most active fields for epoxy based adhesives. Because these adhesives set at low temperature with only contact pressures, stress is at a minimum, an ideal condition for glass-to-glass bonding.

Another field in which epoxy resin is making rapid strides is tool and die construction. In the West, most aircraft manufacturers are using more and more drop hammer dies, checking, drilling, and routing fixtures made of epoxy resin in combination with dissimilar core material. Chief advantages of epoxy resin tooling are superior dimensional stability and higher strength properties.

The latest advance in die making technique, particularly for drawing ferrous metal sheet, are dies built completely of epoxy resin with suitable filler rather than those using epoxy resin only as a surfacing material. This provides the optimum in dimensional stability and die life by eliminating other materials with low strength and poor dimensional stability.

Kish Plastics Products of Lansing, Mich., and Los Angeles, pioneers in Epon plastic tooling, inaugurated this technique. They now make practically all dies of Epon resin, using one formula for the surfacing and another formula for the core. This application is working out well in production of automotive parts and sheet metal forming operations. Die detail and dimensional accuracy hold up for a considerable period of time.

Kish is also making extensive use of Epon resin for constructing various types of laminated plastic tooling such as checking fixtures, drill baskets, and routing and welding fixtures. Here again, dimensional stability and the accuracy with which details can be held over a long period of time make the use of this material very desirable.

Foundry patterns constructed of Epon resin by Kish are showing excellent performance in automotive and other mass production industry foundries, replacing, in most cases, either steel or aluminum patterns. Compared with metal counterparts, the original cost of Epon patterns is about one-third, and delivery time is less than one-fourth.

For more details circle No. 29 on Reader Service Postcard

FLEXIBLE
BUSDROP
CABLE

POWERDUCT eliminates expensive rewiring when equipment must be moved.

This cable makes machinery mobile

PLUG IN POWERDUCT at busduct and machine. See how spring keeps cable taut. There is no costly rigid conduit to rip out.

You may not be utilizing the full flexibility of your busduct system . . . if you aren't matching it with equally flexible, UL-approved ANACONDA Powerduct Cable.

This busdrop cable permits you to quickly relocate machinery. There is none of the expense and bother of ripping out permanent or semi-permanent wiring.

Powerduct is the only nonmetallic-armored busdrop cable approved by Underwriters' Laboratories, Inc. for busway branches under section 3646, 1951 National Electric Code. Always ask for it at your regular supplier. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.* 53319

ANACONDA®

TODAY'S HEADQUARTERS FOR INDUSTRIAL WIRING

Building wire and cable • power and busdrop cables • control and communication wire and cable • distribution cables • magnet wire • wire and cable accessories

ANACONDA ON THE PACIFIC COAST: Plant at: Orange, Calif. District Offices at: Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash.

Who exercises control functions in small plants?

Part 3 of an industrial management survey

By
LOUIS E. DAVIS
Industrial Engineering
and
EARL E. R. JONES
Engineering Extension
University of California
Berkeley

THE CURRENT INSTALLMENT, Part 3 of this series, treats the operating and control functions and the methods for executing them. The functions investigated include: production control, materials control, quality control, personnel selection and training, job evaluation, wages, performance standards, plant layout, tool control, standardization of parts, tools, and materials, accounting, and maintenance.

Production Control

This is the means by which management assures itself that the Production Schedule (see Part 2, WESTERN INDUSTRY — October 1954) is being carried out. In addition, it furnishes accurate, adequate, and current information comparing actual and planned production progress.

Ninety-two per cent of the firms in Group A reported the use of a Production Control scheme. Of these, 36% employed a formal control procedure and 64% used informal methods.

In Group B, 80% reported the use of some type of production control; 75% of these used informal and 25% formal methods. In Group C, the pattern was reversed: 60% of the companies employing formal and 40% informal production control systems.

Responsibility for executing this function was divided as follows: Among firms in Group A, foremen 46%, general manager 27%, his assistant 27%.

Among firms in Group B, assistant general manager 45%, general manager 33%, executive committee 11%, and 11% a committee of skilled workers. In Group C, production manager 60%, foreman 40%.

Materials Control

It consists of a system which assures that the proper quantity and quality of component parts and raw materials are on hand when and where needed, in accordance with previously developed plans. Of the firms in Group A, 58% reported only an informal materials control program, 25% employ maximum-minimum methods, and 8% each use the perpetual and the periodic inventory systems.

Group B is divided similarly: 70% informal, 20% max.-min., and 10% perpetual inventory. Systematic methods are more widely used in Group C. Only 20% rely on informal techniques while 40% employ max.-min. and 20% the perpetual inventory methods.

Responsibility for material control is divided as follows:

Group A—40% of the firms reporting charge the assistant general manager, 30% the general manager, 30% the foreman.

Group B—50% the general manager, 30% his assistant, 20% the executive committee working with the production manager as a worker.

Group C—only 40% reported on this item, and in each case the production manager was responsible for maintaining materials control.

It was noted in many cases that, despite the existence of formal inventory systems, management required a physical check of supplies each time a major order was contemplated or received. Clearly, the systems are not properly installed, or they are not being permitted to work.

Quality Control

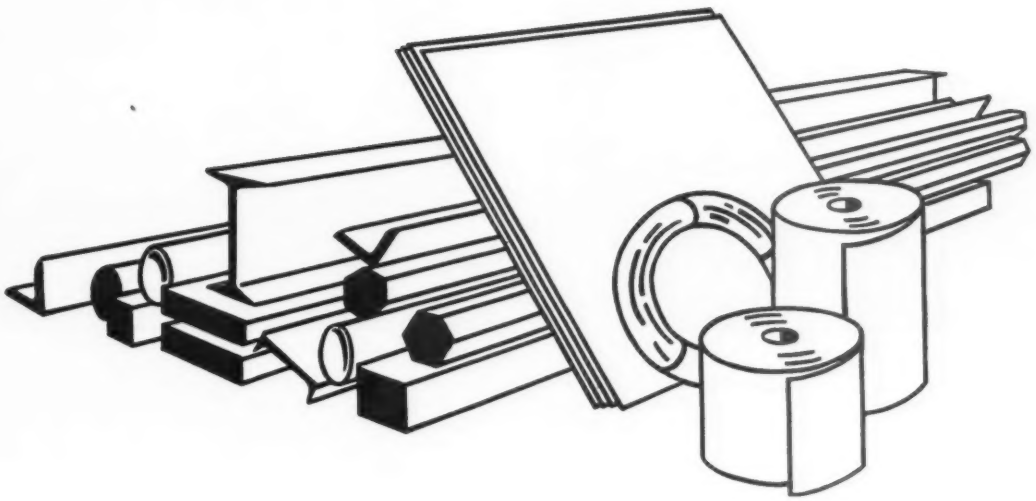
This is the systematic comparison of products and components with manufacturing standards, and the rapid transmission of comparison results to the manufacturing department, where needed corrective measures can be taken to assure proper product quality. Thus Quality Control includes but is more useful than inspection.

Effective quality control was found in only two plants. In those cases, statistical sampling techniques were used and necessary corrective action taken as soon as defects were reported. Four companies in Group A and one in Group C indicated an interest in the installation of a quality control system. About half of the firms in each group employ a formal inspection procedure. The remainder inspect casually or not at all.

In the two companies employing a quality control method, it is in the charge of a quality control technician. In the remaining plants, quality control, or more accurately inspection, is carried out by the following persons:

ARTICLES 1 AND 2 of this series discussed the survey sampling method, the organization structure of the smaller manufacturing companies studied, and the planning functions exercised by their managements. In size, the firms surveyed ranged from 8 to 99 employees, with an average of 33. The companies are divided by size into groups as follows:
Group A.. 8 - 24 employees
Group B..25 - 49 employees
Group C..50 - 99 employees
The previous articles described difficulties encountered by small manufacturing companies in the identification, separation, and organization of management functions. The forecasting of sales and the planning for future needs and operations were also covered.

STEEL



call us for

BARS • SHAPES • PLATES • SHEETS
STRUCTURALS • STRIP • TUBING
COLD DRAWN BARS • PIPE
FLOOR PLATE

HOWARD

SUPPLY COMPANY

5125 SANTA FE AVENUE, LOS ANGELES • KIMBALL 1281

THE HOUSE THAT SERVICE BUILT

For more details circle No. 30 on Reader Service Postcard

TORTURE TESTS PROVE

BEFORE TEST

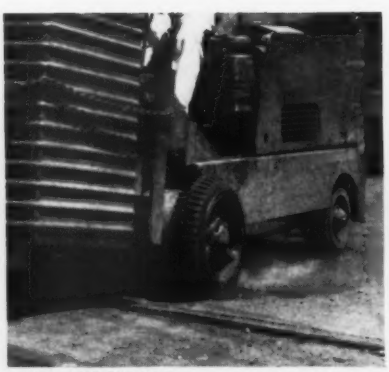
Three standard cushion-type solid tires were used in this test. The Monarch Mono-Cushion was selected from stock awaiting shipment . . . competitive tires were purchased from authorized dealers of two other leading industrial tire manufacturers.

AFTER TEST

This unretouched photo shows comparative condition of same three tires after each had undergone an absolutely identical testing procedure. All tests were made the same day . . . using a constant time interval and same testing equipment.

. . . THE SUPERIORITY OF *Mono-Cushion*® INDUSTRIAL TIRES

TEST EQUIPMENT . . . a standard dual-drive lift truck carrying a loaded tote box weighing 4,864 pounds. Deliberate overload of approximately 44% created by mounting a single 22x6x16 cushion tire on each drive wheel (which normally carries dual tires of this size). Overload increased severity of test and accelerated tire fatigue.



TEST PROCEDURE . . . loaded truck was operated continuously at maximum speed for a fixed time interval. Truck's brakes were jammed on periodically throughout testing period to cause sudden stops and create extreme shock loads.

TEST TRACK . . . was a combination of black top and gravel road surfaces to simulate severe operating conditions (for both indoor and outdoor applications). A railroad spur in the plant yard was included in the test pattern.

HERE ARE THE FACTS

THAT MEAN SAVINGS TO YOU

(1) ONLY MONO-CUSHION SURVIVED THE TEST . . . the other tires were too damaged for normal use. TIRE "A" lost a section of tread 6 inches long and 1 inch deep. TIRE "B" was badly chipped and had two deep splits that reached almost to rim. This is additional proof that *Mono-Cushion is a better buy . . . it costs less initially and lasts longer.*

(2) MONO-CUSHIONS GIVE YOU MORE TON-MILES PER DOLLAR . . . because the rubber stocks developed especially for these tires are compounded from *higher quality materials than are used in the best "premium" passenger car tires.* This is no idle claim. It is another fact previously known only by Monarch's key personnel.

(3) MONARCH SUPPLIES PERFORMANCE-PROVEN INDUSTRIAL SOLID TIRES. Working closely with lift truck manufacturers, Monarch engineers have created tire and tread designs that assure maximum cushioning action for vehicles, loads, floors and drivers. A leading supplier of pressed-on tires, Monarch has a type and size to meet every lift truck requirement.

WHEN YOU NEED TIRES, REMEMBER MONARCH . . . THE KING OF THE SOLIDS

YOUR NEAREST MONARCH TIRE DEALER is listed in the Yellow Pages under "Trucks-Industrial-Parts & Supplies" or "Tires-Industrial". If current directory does not have a listing, write direct for complete catalog and name of nearest dealer.

THE MONARCH RUBBER COMPANY

3083-MR

280 Lincoln Park • Hartville, Ohio

7-255 General Motors Bldg., Detroit 2, Mich.

Group A, with 75% reporting, general manager 10% of those reporting, his assistant 22%, the production foreman 45%, and skilled workers 22%.

Group B, with 80% reporting, quality control technician 12% of those reporting, production foreman 38%, workers 50%.

Group C, with 100% reporting, 20% quality control technician, 20% production foreman, 60% workers.

Personnel

Personnel selection and training is admittedly an extremely important function of management, yet it receives very little attention. In many cases, suitable labor is so difficult to obtain that selection is out of the question. However, when a choice is possible, it is often made on the basis of a perfunctory interview.

In Group A, the firms depend on the following individuals to select personnel: the general manager 16% of the companies, foreman 16%, a combination of these two 32%, these two officers plus a committee of workers 16%, and other combinations 20%.

In group B, 40% of the firms rely on the general manager for this purpose, 30% upon the foreman, and the remainder is scattered among members of management and the executive committee.

Eighty per cent of the companies in Group C depend upon the production manager to perform this function. The executive committee selects employees in the remaining 20%.

As might be expected, the training of employees is the duty of the foreman in most cases. The time available to this key line-supervisor for training purposes usually amounts to whatever can be squeezed from his myriad other duties. Thus a typical new employee may, of necessity, be introduced briefly to his co-workers and turned loose on the job with little more than a sketchy outline of his duties and perhaps a word about safety.

The persons responsible for training new employees are divided as follows:

Group A, foreman 75%, foreman and general manager or the latter's assistant 16%, the general manager 8%.

In Group B, the foreman 80%, executive committee 10%, skilled workers committee 10%.

In Group C, foreman 100%.

Job evaluation

Job evaluation is a system for equitably relating and ordering all jobs in a company in order to establish job classifications for wage payment purposes. Generally, the firms interviewed relied exclusively upon union contract negotiations as a means of establishing job classes.

Wage systems

Wage payment systems were found to be lacking and payments made were in accordance with standards set by union agreement. All of the companies covered in this study can be termed small. It is not unusual or surprising, therefore, to find that the wage scales in effect have been set by bargaining elsewhere in the community and carried to a particular firm by the unions. In much of this bargaining, the manufacturers are represented by an association of companies. Thus the rates of pay tend toward equality throughout the community.

Certain exceptions were noted, however.

In Group A, most of the firms exceeded the basic union scale. Premium wages were reported by 58% of the plants, profit sharing by 16%, bonus by 8%, piecework by 8%.

Premium wages are offered to some employees by 30% and to all employees by 10% of the firms in Group B. Profit sharing for executive committee members only was reported by 10%. The remaining companies in this group adhere to union scale.

In Group C, 20% offer premium wages to some employees and 20% provide profit sharing for members of management. One firm stated that it had discontinued its profit sharing because of discontent generated during periods of low profits.

Standards

Performance, or output standards, establish the units of output for operations. A first approximation of these standards is made in a few instances through the use of historical data cards kept for each job as it has been produced in the shop. Prior to submitting contract bids or commencing production runs, the appropriate data cards are reveiwed for costs and performance standards. Although this method gives only relative values and is subject to continuous fluctuations, it provides an invaluable aid in estimating for future operations.

Formal standards were reported in effect by 16% of the plants in Group A, 10% in Group B, and 20% in

Group C. There appears to be no clear pattern of responsibility for establishing work standards among the companies surveyed. Various combinations of the following persons are to be found: the general manager, the production manager, the foreman, the executive committee, and the workers.

Layout

Plant layout embraces the reasoned locating and relative positioning of buildings, equipment, and machinery to facilitate the flow of work through the plant. The high volume producer may best serve his purpose by employing straight and specialized production lines, minimizing backtracking of work and in-process storage. The job-shop manager may locate his equipment according to type, so that a skilled operator may supervise all production from each type of machine. In the job-shop, production lots are small and orders dissimilar; thus, the production line would be of little if any value.

Group A reported formal consideration or systematic treatment of plant layout in 33% of the plants visited; the remainder indicated an informal-to-casual treatment of the function. Of the 80% reporting in Group B, 12% commented that their plant layout was handled formally and the remaining 88% informally, or without systematic study. Twenty per cent of the firms in Group C give formal, and 80% give informal treatment of this function.

Responsibilty for the satisfactory layout of facilities is charged in Group A as follows: general manager 58% of the cases, general manager and his assistant 16%, the assistant alone 8%, the foreman 16%.

The 80% reporting in Group B are divided as follows: general manager 25%, general manager and foreman 38%, executive committee 25%, production manager 12%.

Among the Group C companies, it is as follows: executive committee 40%, production manager 40%, and the general manager 20%. Two of the firms studied stated that they receive significant assistance in their plant layout problems from consultants or from equipment vendors' layout specialists.

More often than not, it was found that once the initial layout had been made, little systematic consideration is given to this function. Often the actual solution of layout problems is left to the foreman or even the workers, few of whom have had any suitable training. The usual result is a layout which "just growed" like Topsy.

Tool Control

Tool control is a method of accounting for all of the company-owned tools and assuring that they are available for use at the proper place and time. To be effective, it must include every portable tool from the smallest screwdriver to the most expensive milling cutter.

Tool cribs and shadow boards are used in implementing tool control, although inadequate follow-up was admitted in most cases. Several firms indicated that they had no idea of the extent of their small tool losses. Others felt no need for control since practically all small tools are owned by the employees.

In Group A, 25% of the firms reported that some form of tool control is used. Fifty per cent have no control and, of these 84% stated that they do not want a tool control system; the remaining 16% would like to adopt one.

Only one firm each in Groups B and C reported concerning tool control. Each indicated that a system is in effect.

Standardization

Standardization of materials, parts, and tools represents an excellent opportunity to reduce the cost of manufacturing, and there are a number of operational areas in which it can be carried out. However, it is important to distinguish between levels of standardization. Each has its contribution to make; however, the more advanced the level, the greater the economies to be achieved. For instance, greater reductions in manufacturing costs may be achieved by a firm's adopting its own standard materials than through using standard purchased materials.

The former, a more advanced level of standardization of materials, requires that a study be undertaken of all the materials which could be used for all the products in a line, to determine the minimum number of materials usable for the maximum number of products in the line and then standardizing on these. The same would apply to purchased parts, components, and tools.

The type of standardization observed in most of the companies in the sample involves the use of standard purchased tools, materials, and components. A few companies, who made a line of related products, had designed interchangeable standard components which are employed in a number of products.

Of the companies in Group A, 60% reported extensive use of standardization, usually of a lower level; 24% reported the use of partial standardization, and 16% did not use it nor were they interested in attempting to do so.

In Group B, 60% reported the extensive use of standardization, 20% the use of some standardization, and 20% did not use it nor was it applicable to their operations.

In Group C, 60% of the companies reported the fairly extensive use of standardization and the remaining 40% had partial standardization.

The record in regard to standardization is generally good. Most companies are aware of the need for it and of the benefits accruing from its use.

Accounting

Accounting procedures were found generally to be somewhat lax. On the basis of the incomplete reports noted below, it appears that many small companies are not apprised of their financial position at intervals more frequently than once each quarter, and some at intervals of one year.

The frequency of trial balances was indicated as follows:

In Group A, 58% reported, of which 43% strike a trial balance monthly, 28% quarterly, and 28% annually.

In Group B, 70% reported, of which 86% obtain a trial balance monthly and 14% quarterly.

In Group C, the 40% reporting indicated a period of one month.

Profit and loss statements are drawn at the following frequencies:

Of the 50% reporting in Group A, 50% monthly, 17% quarterly, 33% annually.

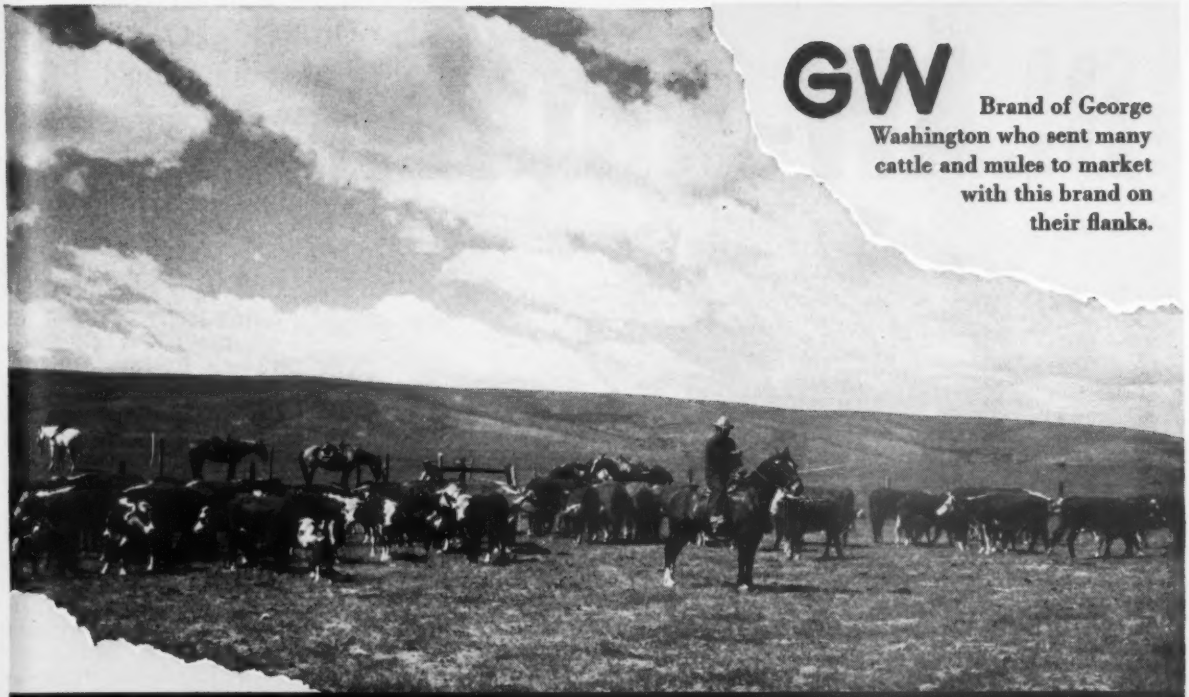
In Group B, of the 40% reporting, 75% quarterly and 25% monthly.

In Group C, the 20% reporting draw the P & L statement annually.

Maintenance

Systematic maintenance of equipment is notably lacking in most instances. A few firms contract with service organizations for periodic inspection, repair, and lubrication of equipment.

Part 4 of this series will evaluate survey results.



GW Brand of George Washington who sent many cattle and mules to market with this brand on their flanks.

Famous Brands

Starrett

HACKSAWS AND BAND SAWS... *distributed in Southern California and Arizona by* GARRETT SUPPLY

World-famous for fine precision tools, the L. S. Starrett Company also makes a wide variety of hacksaws and band saws. Garrett Supply Company carries over 100 sizes and types of Starrett hand and power hacksaws, metal and wood cutting band saws and blades. Trained specialists are available on short notice to help you solve material cutting problems and select proper saws.

Starrett is only one of the many famous brands of industrial supplies and tools stocked by Garrett Supply. Here you will be served quickly and accurately from a huge inventory of over 35,000 items. Consult our catalogue or call for information. Whatever you need—"Get it from Garrett!"

HEADQUARTERS IN SOUTHERN CALIFORNIA AND ARIZONA FOR THESE AND OTHER FAMOUS BRANDS

Athol Vises
Carboloy
Boston Gears
Stanley Tools
Nicholson Files
Chicago-Latrobe
Gates Rubber

IN LOS ANGELES **Kimball 7221**
IN PHOENIX **ALpine 3-6104**

GARRETT SUPPLY COMPANY

3844 South Santa Fe Ave., Los Angeles 58, California
130 West Madison St., Phoenix, Arizona

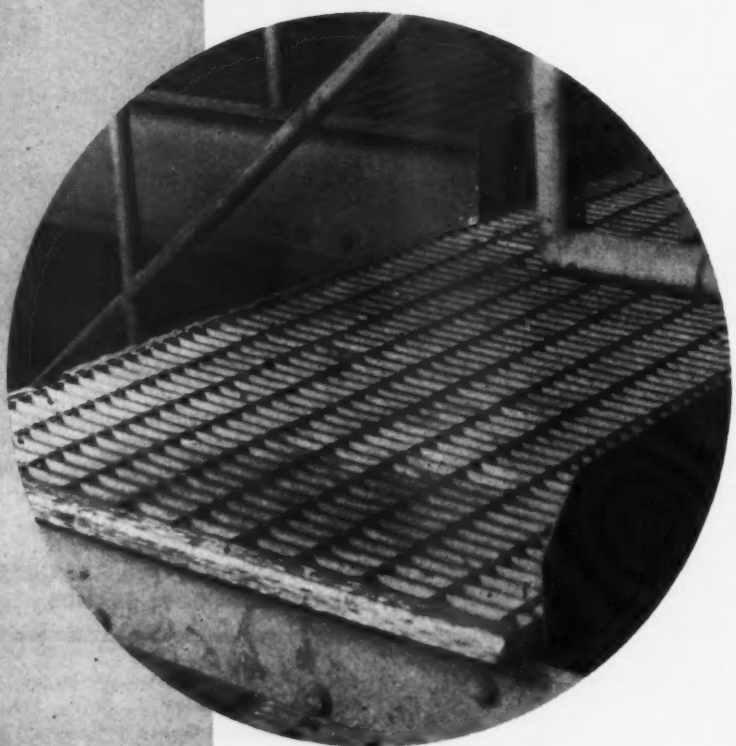
a division of THE GARRETT CORPORATION

For more details circle No. 32 on Reader Service Postcard

BLAW-KNOX

Electroforged

STEEL GRATING AND TREADS



STOCKED AND FABRICATED ON THE WEST COAST BY:

BSP

BRODHEAD STEEL PRODUCTS CO.

17th & WISCONSIN STREETS, SAN FRANCISCO 10

AGENTS:

S. F. Patterson, 1717 West Austin St., Seattle 6, Wash.

W. G. Ballantyne, 1215 N.W. Everett St., Portland, Oregon

Harrison & Co., 436 Atlas Building, Salt Lake City, Utah

Bogart Co., 6010 S. Normandie Ave., Los Angeles 44, Calif.

J. M. Moore, 903 U. S. National Bank Bldg., Denver, Colorado

For more details circle No. 33 on Reader Service Postcard

QUALITY CONTROL
Statistical method pays off in frozen foods

STATISTICAL quality control in frozen fruit and vegetable processing is in its earliest stages but already produces good dividends, the regional American Society for Quality Control conference at San Diego in August learned from E. Terry Dalton, quality control supervisor of PictSweet Foods, Inc., Mt. Vernon, Wash.

For example, product savings in package filling operations were estimated at $56,000, and freight and storage economies through reduction in shipping weights an additional $27,000. An unevaluated dividend is the transporting of more cases of product without incurring highway overload fines.

Asparagus spears are trimmed to fit neatly into a 5¼-in. carton, by aligning them across a belt leading to a circular caw. Just before the spears reach the saw which trims the butts, a "tamper" makes final alignment of the spears.

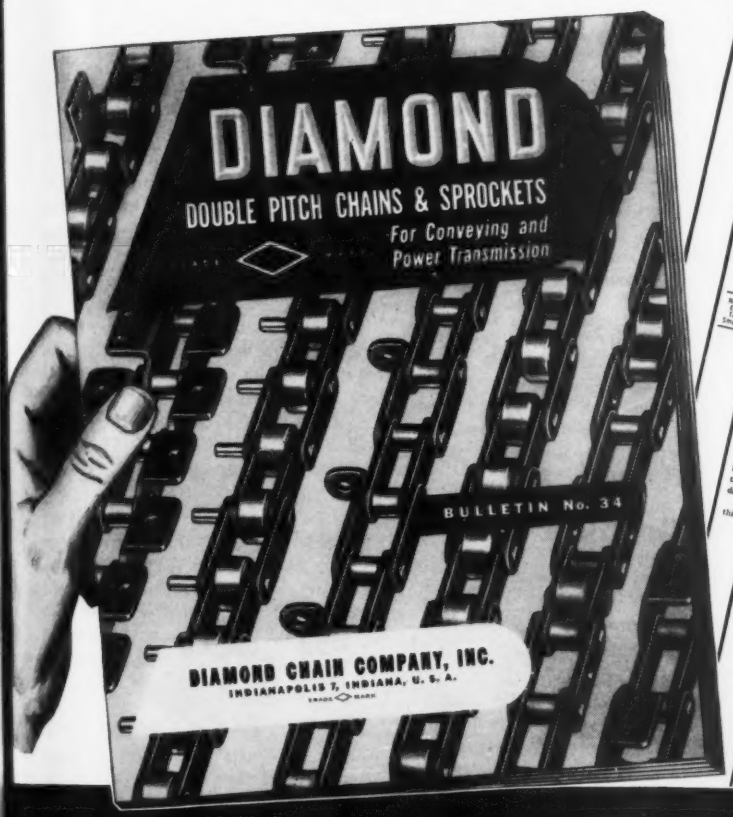
Four trimming lines were put under $\overline{X}$ and R chart surveillance, and within four days PictSweet was able to reduce the variation in spear lengths by improving the tamping operation. It was then possible to adjust all four lines to a process standard representing an improvement of 0.1 in. in average length, equivalent to 2% more finished goods from the same quantity of raw material.

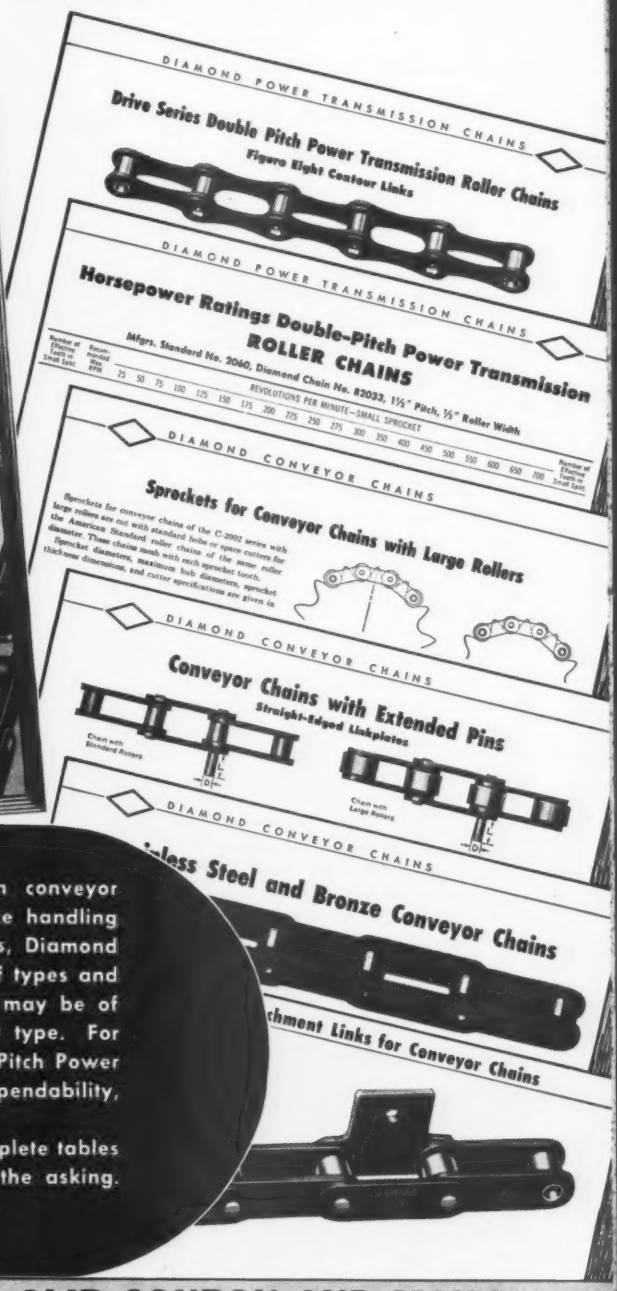
By using the same type of charts for studying the capabilities of wrapping machines, it was found that their precision permitted the use of smaller package wraps, which the company expects will save over $17,000 annually on labels.

Industry practice in frozen sliced strawberries has been to attempt to pack a fixed average ratio of fruit to sugar, letting the packaged finished product vary in sweetness as dictated by the raw fruit and the normal variables associated with ingredient blending. By reducing the overall between-package variation in sweetness through adding less sugar to the sweetest fruit and compensating the crops that are deficient, lower ingredient costs to the amount of $5,000 more than the cost of maintaining controls have been achieved without lowering consumer acceptance.

Product appearance has improved as the result of better control of cutting machines, and cutter mechanics developed a new interest in their work because some measure of performance was provided.

NEW BULLETIN 34 Simplifies Selection of Conveyor Chains and Moderate Speed Power Drive Chains




DIAMOND POWER TRANSMISSION CHAINS
Drive Series Double Pitch Power Transmission Roller Chains
Figure Eight Contour Links
DIAMOND POWER TRANSMISSION CHAINS
Horsepower Ratings Double-Pitch Power Transmission
ROLLER CHAINS
DIAMOND CONVEYOR CHAINS
Sprockets for Conveyor Chains with Large Rollers
DIAMOND CONVEYOR CHAINS
Conveyor Chains with Extended Pins
Straight-Edged Linkplates
DIAMOND CONVEYOR CHAINS
Bronze Conveyor Chains
Attachment Links for Conveyor Chains

Precision-made conveying media are important in modern conveyor systems, sorting, timing and feeding mechanisms and for the handling of materials, containers, parts in process. For such functions, Diamond Double-Pitch Conveyor Chains are made in a great variety of types and sizes. Attachments can be located at intervals desired and may be of the bent or straight type, extended pin, pusher or cradle type. For moderate speed transmission of power the Diamond Double-Pitch Power Transmission Chains provide light weight with complete dependability, and long life, attractively priced.

The 32 pages of New Bulletin 34 carry illustrations and complete tables for easy selection. Just off the press, a copy is yours for the asking. Tear out the coupon reminder now.

DIAMOND CHAIN COMPANY, Inc.
Dept. 606 402 Kentucky Ave., Indianapolis 7, Indiana

Offices and Distributors in all Principal Cities
Please refer to the classified section of your local telephone directory under the heading CHAINS OR CHAINS-ROLLER

DIAMOND
DOUBLE-PITCH CHAINS AND SPROCKETS

TRADE ◆ MARK

For more details circle No. 34 on Reader Service Postcard

CLIP COUPON AND MAIL!

Diamond Chain Company, Inc.
Dept. 606, 402 Kentucky Ave.
Indianapolis 7, Ind.

Please mail a copy of your New Bulletin 34 to:

Name_____

Firm Name_____

Address_____

City_____ Zone____ State_____

Pre-test your foreman

Evaluate what he will do, not what he is doing now.

Top psychologist's methods

Dr. Floyd Ruch, who heads up Psychological Services, Inc., the Los Angeles organization whose methods are described in this article, is rated as one of the country's ten top psychologists.

His textbook, "Psychology and Life" is required reading in more than half of the introductory psychology courses in United States colleges. During the Korean affair, the Air Force named him a "unique contractor" in recognition of the fact that no other psychologist was qualified to bid against him on certain types of morale and fatigue research.

Dr. Grimsley, though younger, is also a top man. He worked after the war with Dr. Orlo Crissey at the General Motors Institute. Crissey was the big pioneer in the '30s and set up the G.M. testing program. Now, in the '50s, Grimsley has pioneered the "short form" tests which have made it practical for more companies to use this tool.

THE other day a West Coast plant superintendent had to replace one of his assembly foremen. He followed a time-honored procedure: he picked a lead man who combined high seniority with excellent technical knowledge of the job.

"Many more promotions like that," says Dr. Glen Grimsley, "and the company could go out of business."

Picking foremen is part of Dr. Grimsley's job. He is personnel research director of Psychological Services, Inc., a Los Angeles firm which specializes in selecting, training, and evaluating personnel for private industry and the armed forces.

"This new assembly foreman didn't do too well," he goes on, "and the personnel people asked us to test him. We found he just didn't have what it takes to make a foreman. And we pointed out to them that he probably shouldn't have been made a lead man in the first place.

"The first step in picking the right foreman is picking lead men who have the abilities they'll need as foremen. By the same token, several of your foremen should be able to take over as general foreman."

Management's big problem in selecting supervisory workers lies in the fact that it can only evaluate candidates on the basis of how they are handling their present duties. This is not always an indication of how they'll do in a bigger job, calling for different abilities.

The answer, according to Dr. Grimsley and the growing army of industrial psychologists, is to find out in advance—by means of paper-and-pencil tests—whether candidates possess these different abilities.

Psychological testing actually dates back to World War I and the old "general intelligence" and I.Q. tests. These were later adopted by several industrial firms, but in the '30s they were replaced by the so-called "unique" tests, designed to measure specific aptitudes.

Dr. Floyd L. Ruch, president of Psychological Services and professor of psychology at U.S.C., helped to refine some of these specialized tests for the Navy during World War II. But they were still cumbersome, often requiring 15 or 20 minutes to complete, and their widespread use was not practical.

Grimsley was one of the first postwar psychologists to work out short quizzes (never more than five minutes), which would be equally predictive of a candidate's abilities.

"It still isn't practical to test every person who applies for a job," he says, "nor even all the ones you put to work. But you should certainly screen all those who become candidates for lead man."

Some of these candidates are nominated by their foreman on the basis of their performance; the personnel department names others on the strength of their personal histories. Then all should be tested, preferably in a group, always on company time.

Procedure is to give them a set or "battery" of tests, each chosen to measure a particular ability needed in the higher job. Findings, confirmed by personal interview, are passed down the line to the supervisor who has a vacancy to fill. And while the supervisor retains the right to make his own promotions, he thinks twice before he disregards the test scores.

"Deny the foreman this kind of help," Dr. Grimsley says, "and he's apt to pick a lead man with good know-how but with none of the mental or temperamental requirements for leadership. Of course, if you find out in time you can usually prevent the man from going on up the ladder.

TYPICAL test situation. Man with a step-watch is Dr. Glen Grimsley.

Standard Engineer's Report

CASE HISTORY
Calol TR Compound
LUBRICANT
Westinghouse Electric Corp., Sunnyvale, Calif.
FIRM

Westinghouse doubles tapping machines' output!

SINCE USING CALOL TR COMPOUND in place of the usual tap lubricants at the Westinghouse plant in Sunnyvale, California, operators have been able to run tapping machines, like those above, at twice the previous speed without rejects. In spite of the increased speeds, taps now last two to three times longer in work with all types of steel, including stainless. Sam Margolis, Group Leader, says that Calol TR (Tapping-Reaming) Compound not only lengthened tap life but doubled machine output.

REMARKS: This plant manufactures switch gears, transformers, and other electric and electronic equipment. In addition to iron and steel parts, special alloys such as silicon bronze are machined.

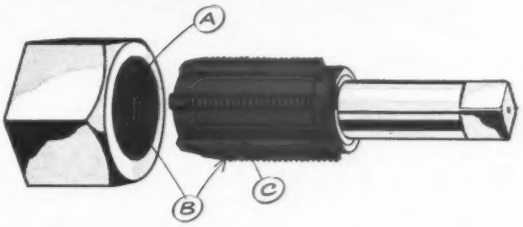
FREE CATALOG: "How to Save Money on Equipment Operation," will be sent on request to Standard Oil Company of California, 225 Bush St., San Francisco.

FOR EXPERT HELP on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write to 225 Bush Street, San Francisco.

CALOL

TRADEMARK "CALOL" REG. U. S. PAT. OFF.

How CALOL TR Compound ups efficiency in severe metal-working conditions



A. Contains two unusually active extreme-pressure additives—prevents tearing, scuffing, galling of work, promotes good finish.

B. Withstands extreme temperatures—stops welding of tool and work, resists distortion, betters accuracy.

C. Provides good lubrication—allows faster machine speeds, increases production. Easily applied by brush or swab.

STANDARD OIL COMPANY OF CALIFORNIA

For more details circle No. 35 on Reader Service Postcard

But you've still got a problem.

"If you demote him, it's hard on his morale. Yet in his present job, he's filling a valuable training spot. And as you promote others around him, he's going to turn sour, anyway.

"But it will be a lot worse if you don't find out in time, because then he'll probably become a foreman. His technical ability will make him 'look good,' and you won't think of blaming him for the things that start going wrong in his department. Meanwhile, he'll be appointing poor lead men. Incompetence can be contagious, and it can kill a healthy plant."

Reaching into a desk drawer, Dr. Grimsley pulls out a handful of blank questionnaries. There are about 35 of them, each designed to measure a different psychological trait, but only 10 or 15 are needed to measure abilities required by a particular job. Many were written by Ruch, Grimsley, and their associate, Dr. N. D. Warren, and all reflect the progress made in industrial psychology during the last 40 years.

Their purpose is not only to point up candidates who are ready for more responsibility, but also to find out where others are still weak. No worker is ever fired for making a poor showing, but some are given extra guidance.

Technical ability is not tested, since candidates for advancement are presumed to have mastered their job. The tests fall into these six basic categories:

1. Intelligence
2. Mechanical aptitude
3. Occupational interests
4. Personality or temperament
5. Strength of motives
6. Human relations

There's one big different, however, between these tests and the usual quiz: the "excellent" rating doesn't always go to the man with the highest score. In some cases, the psychologists are looking for the man who scores low; in others, they don't want a low score but they're afraid of a high one:

Final evaluation is based on a comparison of over-all ratings on these six categories, supplemented by personal interviews. Here are the criteria used in picking the right man for the job:

1. What is the man's intelligence?

The psychologists have tests which break this big question down into several small ones: Can he think straight? Is he quick with numbers? Does he have a good vocabulary? Can he express himself well?

Dr. Grimsley once gave a low rating to a foreman regarded by his employers as one of their best men. The tests showed he lacked reasoning ability, although he had managed to hide this weakness behind his many years of service and routine knowledge of the job. Despite this warning, the company offered him a promotion. But the man knew his own limitations and turned the offer down.

2. Has he mechanical aptitude?

As a supervisor, he'll have to be able to think through mechanical situations and come up with practical solutions for everyday problems. Questions have to do with gear ratios, levers, center of gravity, and other basic mechanical principles.

For the man who knows these principles, the questions are easy. And the man who has the aptitude but not the knowledge will usually do well, too, because he can see the problems and reason out the answers.

Dr. Grimsley has known eighth-grade students to make top scores on these tests, not because of any training but through an almost intuitive understanding of mechanics. Yet he recently tested a graduate engineer

You get MORE from **MOORE**

MOORE can machine the largest of Weldments, Fabrications, Forgings, or Castings. Yet small work, too, receives careful attention.

Forty Nine Years of "Know How," Modern Machine Tools and Skilled Machinists will produce Dependable Rapid Repair Work and Accurate Production Work.

Send for brochure of our Complete Plant Facilities

MOORE DRY DOCK COMPANY
THE COMPLETE INDUSTRIAL PLANT

Foot of Adeline St., Oakland 23, California
Higate 4-3919

FORGING, HEAT TREATING, MACHINING, GRINDING, PLATE-SHEET-PIPE-FABRICATION, STRUCTURAL STEEL FABRICATION AND ERECTION

For more details circle No. 36 on Reader Service Postcard

We've tackled problems far and wide
It's taught us how to serve

Let routing by U. P. provide

The Service You Deserve

UNION PACIFIC RAILROAD

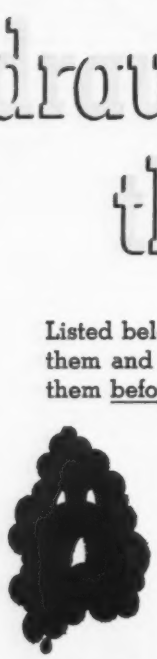
In their many contacts with shippers and receivers, Union Pacific representatives discuss various phases of freight transportation . . . make every effort to offer helpful suggestions. As a result of these contacts, they accumulate information and ideas that might very well be of value to you. We hope you will give the U. P. freight man an opportunity to be of assistance to you whenever possible . . . and also make full use of the fine service provided by our railroad.

(OFFICES IN 70 CITIES THROUGHOUT THE U. S. A.)

For more details circle No. 37 on Reader Service Postcard

Now you can stop hydraulic failures before they stop you

Listed below are the four major causes of hydraulic failure. Check them and see how Shell Tellus Oil is specially designed to stop them before they cost you money



Sludge build-up. Shell Tellus Oil's special *inhibitor* actually stops oxidation (major cause of sludge) even under low operating temperatures

Lacquer build-up. Shell Tellus Oil's unique *cleansing properties* keep lacquer formation down . . . help keep hydraulic action smooth

Foaming. Shell Tellus Oil's special *foam inhibitor*, plus careful selection of base oil, prevent oil loss due to foaming

Abrasive rust. Shell Tellus Oil's patented formula containing *rust inhibitor* stops progressive rust—even when hydraulic parts are exposed to salt water

These factors make **SHELL TELLUS OIL** fine for all your machine tools and vital motor bearings, too. Try it next time they're due for oiling

SHELL®

For more details circle No. 38 on Reader Service Postcard

who was powerless to put his training to work on simple problems.

3. What are his interests?

This is perhaps the most important question of the six, for it governs how much of himself the candidate will put into the job and how much he can get his subordinates to give of themselves.

First off, is the man interested in his work? Some men are not, even though they may have a lot of aptitude for it. Some men work solely for their paycheck; their real interests are elsewhere and they "live away from the job."

Next, is he interested in people? This is important in a supervisor, but sometimes hard to find. Some kinds of training—such as engineering and accounting—produce men more interested in "things" or abstractions than in people.

In addition, the bright man (who is apt to be a candidate for promotion) may lack sociability. He can build and live in a world of his own, while less intelligent workers need the company of others. Yet you want a happy medium, for the man too dependent on other people is no better than the one is who too socially independent.

But if the man is interested in people, what kind of interest is it? Does he like them for what they are or does he like to manipulate them? Here again you've got to avoid the extremes. The manipulator who carries this too far becomes a sort of cynical politician, while the man who can't manipulate people at all won't make a good supervisor either: he'll never be able to sell his ideas to his workers.

Liking people is more important than liking to manipulate them, but the supervisor who likes them too much becomes a "bleeding heart" and may side with his men against management.

Dr. Grimsley tells the classic story of the foreman who assigned a man to iron dents out of parts as they came off the assembly line. Dents were circled in chalk by an inspector. But for weeks the man wiped off the chalk mark whenever he didn't feel like ironing out the dent. The foreman know of this, but because he was too softhearted to reprimand the man, he betrayed his company's trust.

4. What's his personality like?

A good foreman is a good leader. He is emotionally stable, self-disciplined but aggressive. He dominates people, but he does it nicely. He can take criticism without offense, but doesn't alter his policies unless the criticism has merit. And he brings to the job a driving energy.

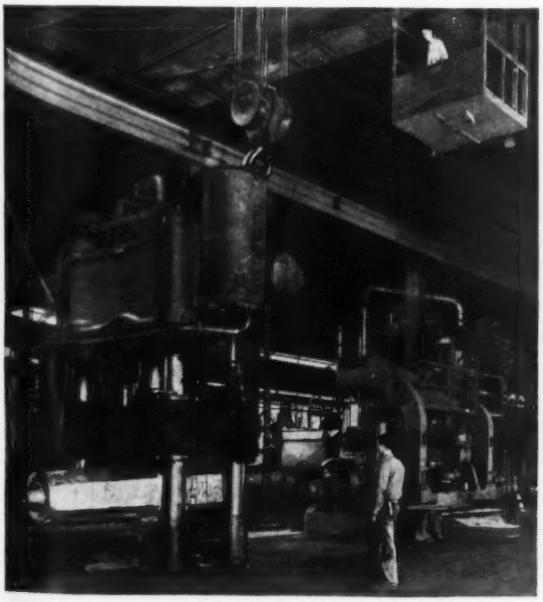
Paper-and-pencil tests measure these traits with a high degree of accuracy. For example, from the scores on tests rating energy or stamina, Dr. Grimsley has sometimes urged a worker to see his doctor. And in several of these cases, the physician has found a tubercular or heart condition.

But once again, both extremes can be dangerous. A man with too much energy and too domineering a manner can alienate the people under him. In picking a man to supervise women especially, Dr. Grimsley avoids excessive masculinity, as this will tend to make the supervisor crude and inconsiderate.

5. How strong are his motives?

This is the psychologists's way of asking, what makes him tick? Does he believe in God? Does he believe in democratic government? Does he believe in people?

Unfortunately, a lot of able men have acquired deep inner scars. They have been pushed around and have had to fight back. They have lost confidence in their fellow man and have come to look upon people as fools or cheats. Members of minority groups



Main hoist *on this 50-ton overhead crane uses 7/8" Tiger Brand Wire Rope; manipulator uses 5/8" Tiger Brand.*

Got a critical operation?—use Tiger Brand Wire Rope!

Moving 11 tons of hot steel is a job that calls for complete reliability of equipment. To assure a safe operation, The National Supply Company, Torrance, Calif., rigs its handling equipment with USS Tiger Brand Wire Rope. For extra safety and dependability on your critical wire rope applications, contact your local Tiger Brand distributor.

FREE BOOKLET!

UNITED STATES STEEL CORPORATION—COLUMBIA-GENEVA STEEL DIVISION
1403 RUSS BLDG., SAN FRANCISCO 6, CALIF. WI-11

Please send me your free booklet, "Longer Life From Your Wire Rope".

*Name*_____

*Address*_____

*City*_____ *State*_____

USS

USS TIGER BRAND Wire Rope

United States Steel Corporation • Columbia-Geneva Steel Division

UNITED STATES STEEL

For more details circle No. 39 on Reader Service Postcard

have sometimes gone on the defensive and have covered it by putting a chip on their shoulder.

Despite the ability which has helped such men to fight their way up through the ranks, they are not supervisory material. They don't have enough faith in society.

6. Can he handle people?

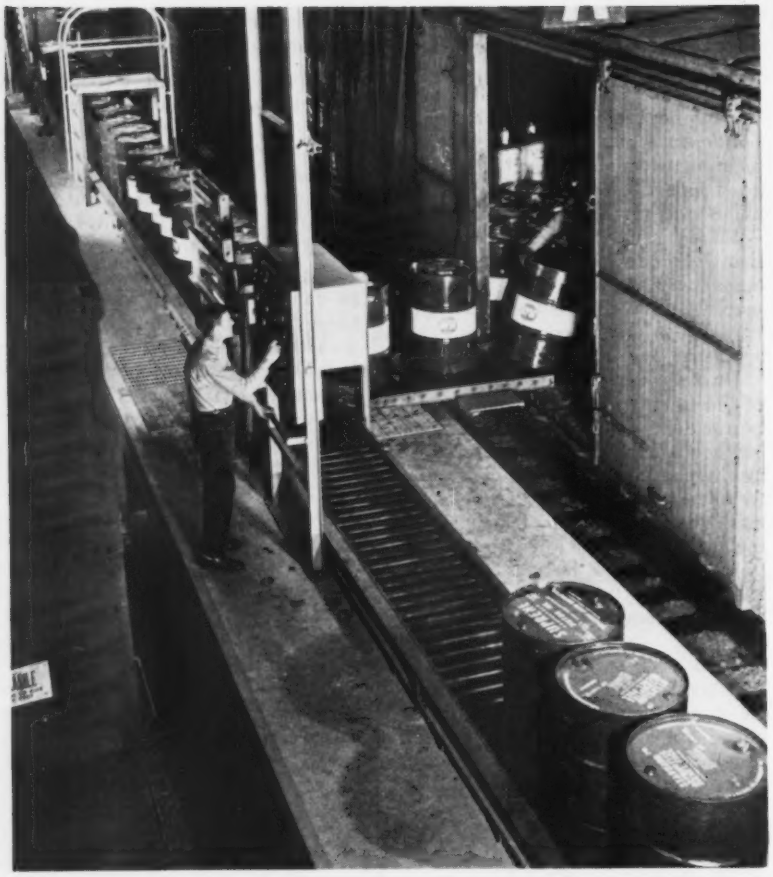
Human relations ability is made up partly of the attitude the man will have toward his subordinates (when and if he is made a supervisor) and partly of the knowledge he has picked up regarding company policy and procedure. Of the two, attitude is perhaps the more important, because "rules" can be learned but attitude is something which foreman will bring into new situations which the rules don't cover.

Essentially, the foreman should be a nice guy. He should be fair, considerate and anxious to treat the other man the way he'd like to be treated himself. This is not all a matter of instinct. It helps to start out with a supply of good will, but there are techniques for handling complaints and similar problems that must be learned, either from observation or in a training course. Little things—like asking subordinates for suggestions before setting up a new policy—might not occur even to a well-intentioned supervisor if he did not have this special knowledge.

When this knowledge is lacking, "gripes" can get a foothold and can even build up into formal grievances. The complicated machinery for handling these situations can cost a company a lot of money. But human relations is not a form of anti-unionism, Dr. Grimsley emphasizes; on the contrary, it is an insistence that labor's views and feelings be taken into consideration.

Foremen, general foremen, and shop superintendents don't always take to the idea of hiring "a bunch of professors" to tell them whom they should promote. A lot of salesmanship is needed to get a testing program started. On the other hand, once the system goes into effect, the results are usually so spectacular that it sells itself. If anything, management becomes too dependent on test findings.

Like other research techniques, testing is a tool designed to help a man do a job. It does not do the job for him. It may supplement his information but it can never take the place of his judgment. Nor is it infallible even in what it sets out to do. But when all this has been said, selection guided by the findings of psychological tests is still one of the best ways to pick the right foreman.



LIVE ROLLER CONVEYERS

one of the many types of high-quality power and gravity conveyers in the MATHEWS line

Live Roller Conveyers may be belt or chain driven, although belt-driven conveyers are generally used for package handling. Having certain advantages over other power conveyers, it is possible to deflect smoothly from Live Roller Conveyers and, where necessary, to stop the load on the conveyer without stopping the conveyer itself.

Live Roller Conveyers are frequently used for conveying materials that could not be practically handled on belt conveyers. They may be hung from the ceiling, set at working level, or operate between buildings.

If you need complete information about Live Roller Conveyers, call your nearby Mathews representative. You'll be glad you did.

Write for Catalog HB-53 for details of Live Roller Conveyers . . . and for Catalog No. 853, which illustrates many installations that will help you with your conveying problems.

MATHEWS CONVEYER COMPANY WEST COAST
SAN CARLOS, CALIFORNIA

LOS ANGELES • PORTLAND • SEATTLE • DENVER
FORT WORTH • DALLAS • HOUSTON • EL PASO
HONOLULU, T. H. • SALT LAKE CITY

Engineering Offices and Sales Agencies in Principal Western Cities

For more details circle No. 40 on Reader Service Postcard

PAPER-COVERED VENEER
A new industry

A NEW paper-covered veneer industry in Oregon has been established within the past year with an annual potential market on the Pacific Coast for 500,000,000 sq. ft., according to the Oregon Forest Products Laboratory, located on the Oregon State College campus at Corvallis.

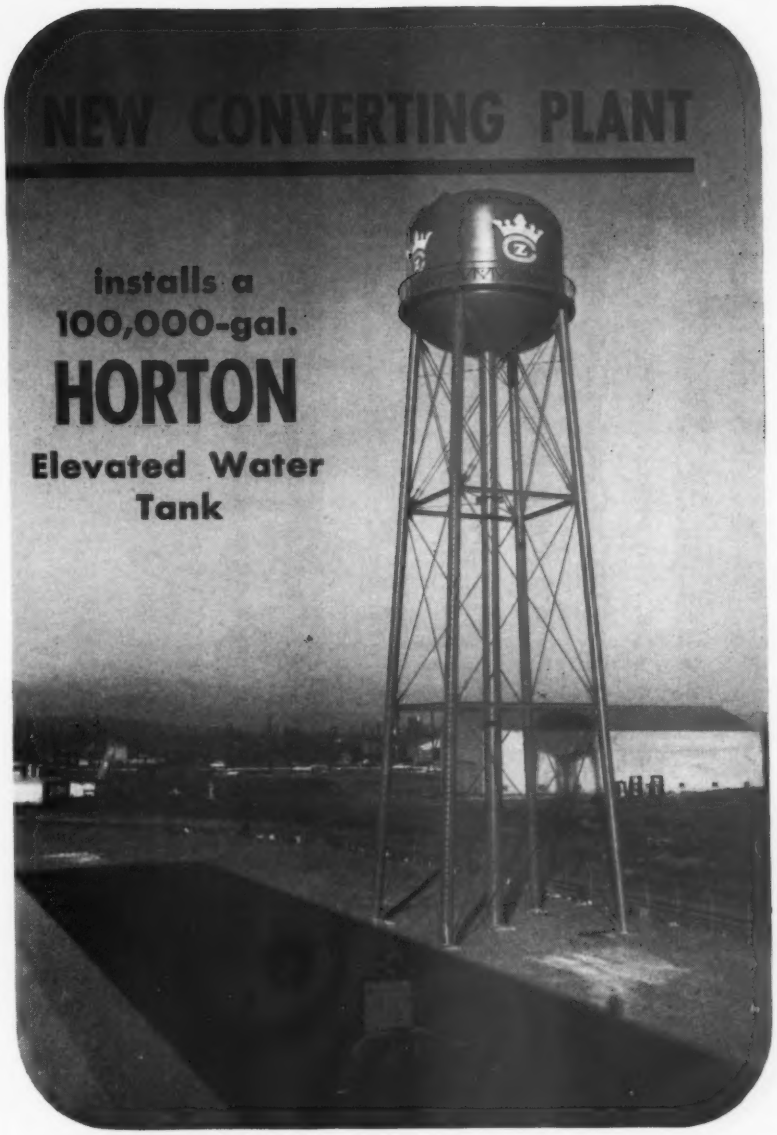
Comparative tests with nailed wood boxes have given paper-covered veneer boxes a high rating for resistance to abuse, rough handling, and ability to take compressive loads. A recently conducted survey indicates that some 26,000,000 sq. ft. of this veneer could be used annually for apple boxes. The new veneer is still another step toward complete utilization of waste forest products. Species used are Douglas fir with white speck and honeycomb, and the less valuable white fir and cottonwood.

California citrus fruit boxes could be made from some 200,000,000 sq. ft. of paper-covered veneer each year, and the aircraft industry could use 80,000,000 sq. ft. for crating assemblies and small parts. Another 40,000,000 sq. ft. could be used by aluminum mills between sheets of aluminum to prevent scratching. This new product should also serve for luggage, furniture crating, dust backs, and bottoms for furniture, freight car linings, packaging pre-fabricated houses, shipping appliances, and other industrial items.

JIB CRANE
reduces handling

A FULLY REVOLVING jib crane, engineered and manufactured by Craneveyor Corp. of Los Angeles is providing maximum safety for workmen while offering a considerable saving in handling time. The new piece of equipment, designed especially for handling power poles and transformers, is operating in a storage yard for California Electric Power Co. at Barstow, Calif.

Prior to the installation of the crane, poles and transformers were manually loaded and unloaded. This method of handling resulted in an unusually high safety hazard. Originally, a minimum of five men were required to load or unload the poles. Now it is accomplished with three men in one-quarter of the time. Further, with the use of the crane, poles can be stacked in racks on top of each other and very close together. This has saved at least 50% of the original storage area.



Shown above is a 100,000-gal. Horton® ellipsoidal-bottom elevated steel tank installed to provide the primary water supply for fire protection at Crown-Zellerback Paper Company's new converting plant at East Los Angeles, Calif. The tank, designed for a 12 per cent seismic force, is connected to an automatic sprinkler system. In addition to the security provided, a system of this type often helps pay for itself through reduced fire insurance premiums.

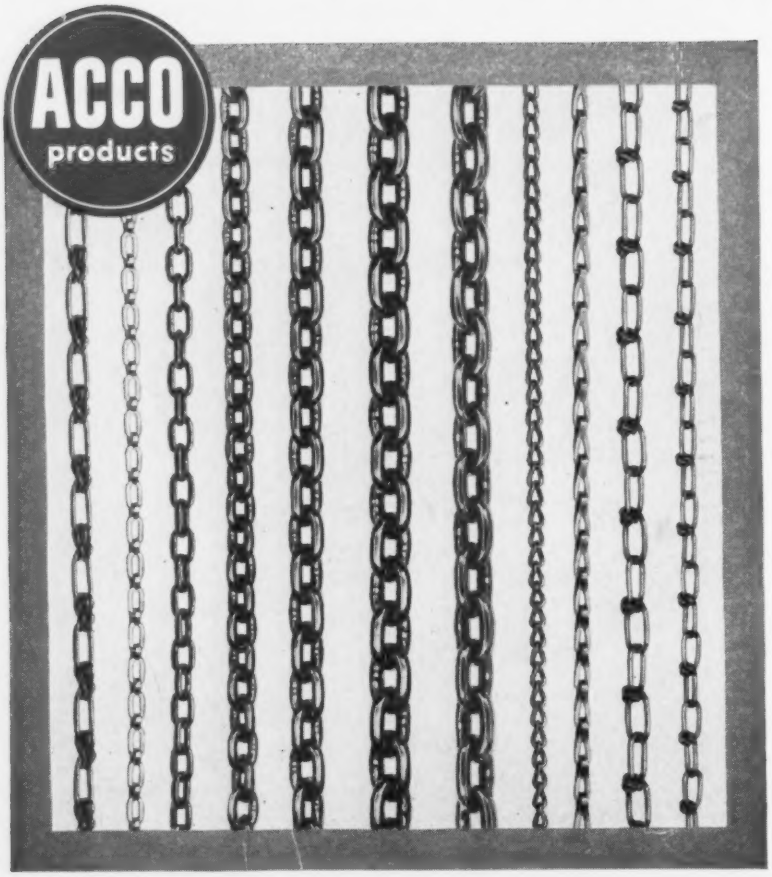
Horton elevated tanks for plant fire protection are built in standard capacities from 15,000 to 500,000 gallons. Write our nearest office for estimates or quotations on a Horton elevated tank for maximum fire protection at your plant. There is no obligation on your part.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3 ..... 2144 Healey Building
Birmingham 1 ..... 1563 North 50th Street
Boston 10 ..... 1065—201 Devonshire Street
Chicago 4 ..... 2132 McCormick Building
Cleveland 15 ..... 2256 Midland Building
Detroit 26 ..... 1567 Lafayette Building
Havana ..... 402 Abreu Building
Houston 2 ..... 2164 C & I Life Building
Los Angeles 17 ... 1570 General Petroleum Building
New York 6 ..... 3334—165 Broadway Building
Philadelphia 3 .. 1666—1700 Walnut Street Building
Pittsburgh 19 ..... 3267 Alcoa Building
Salt Lake City 4 ..... 568 West 17th South Street
San Francisco 4 ..... 1578—200 Bush Street
Seattle 1 ..... 1369 Henry Building
Tulsa 3 ..... 1667 Hunt Building

Plants in: BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

For more details circle No. 41 on Reader Service Postcard



Why does AMERICAN make All Basic Chain Patterns?

• Although two chains may look alike, their end uses differ, resulting in poor service if a substitution is made. For instance, the three heavy welded chains in the middle above appear almost identical except for size. Yet one is designed for general service where great strength is not required, one is for logging, while the third is for heavy duty service.

The same thing applies to the weldless chains. Take the two stamped, flat link chains: the safety chain near the left, and the sash chain near the right side. One has only to keep something from being lost; the other must carry weight and run over a pulley. Alike in looks, yes—but that's as far as it goes.

Probably we can suffice by saying—"AMERICAN *makes all basic chain patterns so you can get the best (and most economical) chain for your every use.*"

Your AMERICAN CHAIN distributor stocks many popular chains. Call him at once for recommendations, or write our York office.

ACCO
DENVER OFFICE • 4555 East 46th Avenue
LOS ANGELES OFFICE • 2216 So. Garfield Ave.
SAN FRANCISCO OFFICE • 890 Tennessee St.

AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE
York, Pa., Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.
TRADE MARK

American Chain

For more details circle No. 42 on Reader Service Postcard

NEW EQUIPMENT for canning

SOME NEW materials handling equipment, designed to improve handling at the beginning of the beer canning line, is to be installed in one of the new breweries locating in the Los Angeles area.

This brewery has ordered four hydraulic elevating tables and two Beacon pallet stackers. The operation starts off with empty beer cans and palletized cartons resting on a storage conveyor. A pallet load at a time is rolled onto one of the lift tables, which is controlled by a man standing on a platform alongside the table and next to a can unscrambling table. By controlling the hydro lift table, this operator can maintain a constant level of cartons on a pallet relative to the height of the can unscrambler.

After removing all the cartons of cans from the pallet, he can slide the empty pallet onto a gravity conveyor which will carry the pallet down onto the automatic pallet stacker. This automatic stacker has an air-driven mechanism and is controlled by the operator. Periodically, the pallets are removed from the back of the stacker by fork truck.

In this particular operation each can unscrambling table will have two men working at it with two hydraulic lifting tables and one pallet stacker which will serve both workers. The new equipment is being supplied by Robco, Inc., Maywood, Calif.

SEED BOXES meet rigid tests

A NEW SEED HANDLING container, designed to reduce the chances for contamination or co-mingling of various kinds or grades of seed, has been developed by the Quiki-Box Manufacturing Co., Spokane, Wash.

The products of seed companies must pass rigid government checks for contamination, making it essential that a seed handling container be developed where no tiny seeds could stick in cracks, crevices, and holes to contaminate the container's next load. The new box has nothing but smooth plywood surfaces on its inside. All supports, fasteners, nail holes, etc., are on the outside. This is made possible by special steel threaded rods which hold the box together and at the same time make it easy to assemble. The rods were produced at Bethlehem Pacific's Seattle plant.

Hard Vulcanized Fibre **KENNETT**

MATERIALS HANDLING EQUIPMENT

To help you move things better... faster... more economically.

Kennett materials handling equipment is now warehoused on the West Coast... at new low costs to you!

Strong! Smooth! Tough! This lightweight equipment line is built to give years of efficient service.

NEW FREE CATALOG on your request

FIBRE SPECIALTY DIVISION
NATIONAL VULCANIZED FIBRE CO.

SAN FRANCISCO • 273 SEVENTH STREET
LOS ANGELES • 2325 E. 8TH STREET
SEATTLE • 4001 WHITMAN AVENUE

TRUCKS • TOTE BOXES • TRAYS • BAKERBOY BASKETS • UTILITY RECEPTACLES • BARRELS • ROVING CANS • DOLLY TRUCKS

For more details circle No. 43 on Reader Service Postcard

McKENNA engineer inspects electronic component of new ultrasonic processing unit.

Ultrasonic processing comes out of the lab

. . . to help industry clean uncleanable parts and blend unmixable fluids.

UNCLEANABLE parts are being made spotless, unmixable fluids like water and oil are being blended, and a new branch of science known as sonochemistry is being brought to life with the most recent developments in ultrasonic equipment.

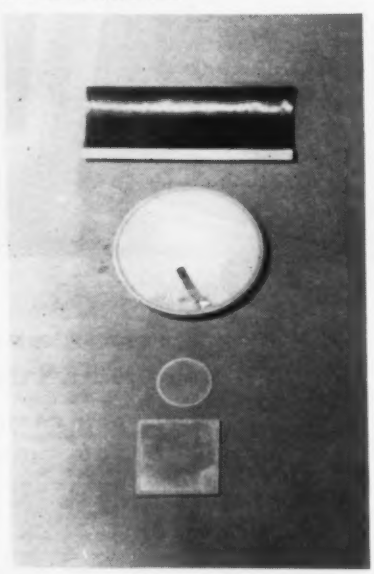
Basic function of the equipment is to generate high-frequency vibrations, or "inaudible sounds," by electrostriction. This involves the conversion of alternating electrical current into radio frequency current for the purpose of expanding and contracting piezoelectric crystals.

Electrostriction has been the most common method of generating ultrasonics for years, but until recently it was limited to relatively small-scale laboratory applications because the only crystals that could be used as electrostrictive transducers were quartz. In addition to being rare and expensive, quartz cannot be satisfactorily machined for all the details that are most desirable in electrostrictive transducers, and it has inherent structural defects which limit both crystal dimensions and operational efficiency.

McKenna Laboratories, Santa Monica, Calif., makers of this type of equipment, have consequently gained a considerable advantage by using "synthesized" ceramic crystals in place of natural quartz crystals as electrostrictive transducers. The synthetic crystals are fabricated by casting and firing barium titanate compositions, much the same as ceramic materials are cast and fired in the manufacture of structural brick and tableware.

Besides having configurations and dimensions that cannot be obtained with natural quartz, barium titanate crystals may have superior piezoelectrical properties because they are powerful dielectrics and can be strongly polarized with high-voltage current after they are fired.

FOUR ceramic piezoelectric crystals of types that now enable construction of ultrasonic processing equipment.



Surfaces of each crystal are metallized so that they will remain polarized (for the same reason that a permanent magnet, equipped with a keeper, will remain magnetized.) Then, rigidly retained by a special holder in the base of an appropriate stainless steel processing chamber, the crystal is attached to the output terminals of an electronic device which is virtually the same as a radio transmitter.

Ultrasonic frequencies produced with this equipment range from about 400 kilocycles to one megacycle. They are obtained by using piezoelectric crystals with varying dimensions, and they serve the basic purpose of concentrating energy at the rate of 100 to 1000 watts per square centimeter.

Configurations of the crystals are such that the ultrasound is focused with optimum effectiveness on solutions placed in their stainless steel processing tanks. Remarkably little energy is subsequently wasted because ordinary air surrounding the tanks serves as in insulator which keeps high frequency vibrations from leaving the processing area.

Although it is large compared with older ultrasonic units, most of McKenna's equipment is appreciably smaller than conventional chemical processing equipment because it has a relatively high level of productivity. For example, where it is desirable to produce an emulsion at the rate of five

Need a low-cost building within 30 days?

Soulé Standard Steel Buildings, with rigid steel frame, corrugated steel sides and roof, steel windows and doors, cost as little as $1.25 per square foot—including erection on your site! Trained Soulé crews install the building, guaranteeing you a trouble-free, workmanlike job. You have a building tailored to your needs, at lowest cost and in shortest time.

- **Up to 40% savings over slow conventional construction**
- **Any floor plan, window and door arrangement**
- **Widths 32 to 80′; Lengths multiples of 20′; Eave heights 10 to 20′**
- **Low maintenance, no painting required**
- **Clear-span design, more usable area**
- **We install immediately on your site**
- **Readily used with store-front facades**

ALL TYPES OF BUILDINGS AVAILABLE NOW!

Industrial • Commercial
Warehouse • Transportation
Ranch and Agricultural

THOUSANDS IN USE THROUGHOUT THE WEST!

SEND COUPON TODAY FOR FREE ILLUSTRATED CATALOG

Soulé
LEADER IN STEEL BUILDINGS

SOULÉ STEEL COMPANY

SAN FRANCISCO Dept. R 1750 Army Street VAlencia 4-4141	PORTLAND Dept. R 2630 N.W. St. Helens Rd. BEacon 5155	SAN JOSE Dept. R 460 Park Ave. CYpress 5-3310
LOS ANGELES Dept. R 6200 Wilmington Ave. LAfayette 0911	SEATTLE Dept. R 4100 W. Marginal Way HOlly 3600	PHOENIX Dept. R 511 East Roosevelt St. ALpine 3-4187

PLEASE SEND ME illustrated Soulé Standard Steel Building Catalog, showing building types and complete details.

Name_____

Company_____

Street_____

City_____ Zone_____ State_____

For more details circle No. 44 on Reader Service Postcard

gallons per hour, an ultrasonic processing unit with a capacity of only one gallon may do the work of a standard unit with a five or ten gallon capacity.

Theoretically, ultrasound won't do anything that can't be done with other forms of energy, but from a practical point of view, ultrasonic equipment methods are often more desirable.

In the Western aircraft industry, for instance, it has been discovered that there is no effective substitute for ultrasonic equipment where it is necessary to clean parts with small holes and other details that are inaccessible to the normal wetting action of a solvent or detergent solution.

Quite naturally, the liquid (cleaning solution) is set into a vibration motion at the frequency of the applied sound. The amplitude of this motion depends on the type and quantity of liquid radiated and the power density and frequency of the sound. For most practical cases, this amplitude is of the order of microns. But at the high frequencies used, even these small amplitudes represent a large amount of energy and tremendous accelerations. For a given amplitude of vibration, the accelerations increase with the square of the frequency.

As sound amplitude increases, a critical pressure is reached where the liquid is actually fractured and vacuous pockets are formed. The formation and collapse of these cavitation bubbles generate extremely large localized pressures. The total forces are small, but they are so localized that a vigorous scrubbing action is obtained.

The presence of cavitation in a liquid can be established by observation of small bubbles and by a hissing sound emanating from the liquid. Because cavitation is a threshold phenomenon, a large volume of liquid can be made to cavitate by using only slightly more power than is required to cavitate a small volume.

Many parts that could not be satisfactorily cleaned with conventional equipment are now being ultrasonically processed in order to save time and floor space, and curiously enough, the cost of such work decreases with each increase in the size of a processing unit.

Stable emulsions

Cavitational effects which permit the use of ultrasound for cleaning purposes also facilitate the production of stable emulsions from such immiscible substances as water and oil, alcohol and mercury, etc., by breaking up the tiny air bubbles that tend to segregate the respective material particles. This is an item of much importance in the manufacture of new-type organic coatings, medicines, perfumes, liquid fuels, and food products.

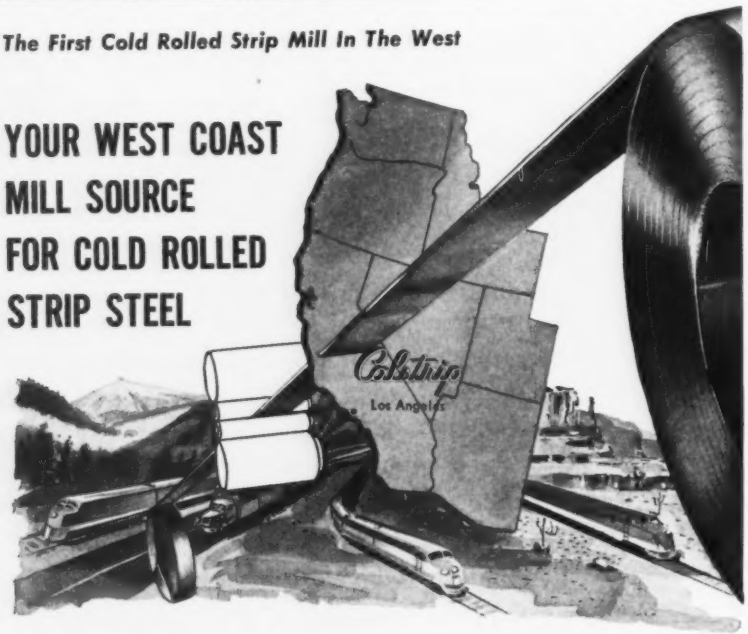
In a new field of sonochemistry, the heating effects of ultrasonics are of further importance. Ultrasound does not heat a material in a readily-measurable way like fire, as a rule, but it can distribute considerable heat among the atoms and molecules of a substance. This makes it possible to:

1. Accelerate the aging of fermented and distilled beverages.
2. Intiate, accelerate, and control chemical reactions—such as those involved in the polymerization and depolymerization of plastics.
3. Sterilize products with low heat resistance.
4. Speed the germination of seeds and the growth of plants.

The ultimate significance of all this remains to be determined, but it is already apparent that ultrasound has progressed beyond the laboratory stage in the chemical processing field.

The First Cold Rolled Strip Mill In The West

YOUR WEST COAST MILL SOURCE FOR COLD ROLLED STRIP STEEL



QUICK DELIVERY! BETTER QUALITY!

The pressure is now on. Buyers insist on prompt service and improved quality. Let us help you meet these demands from your customers.

Plan ahead. Order strip steel direct from Calstrip—a Los Angeles mill serving western industry. You will benefit because we are prepared to fill orders in record time... yet we maintain the high standard of quality always found in Calstrip steel.

Cold Reduction Mills • Rotary Slitters
Roller Leveler and Shear • Bright Annealing Furnaces

CALSTRIP STEEL CORPORATION
MILL AND OFFICES
7140 Bandini Boulevard • Los Angeles 22, California
RAymond 3-1344

Calstrip Los Angeles

For more details circle No. 45 on Reader Service Postcard

IT WORKS WONDERS IN MATERIALS HANDLING-

300 to 400% increase in efficiency

75% decrease in handling costs

One Truck-Mounted Dempster-Dumpster Handles Scores of Containers... All Designs... All Sizes

With the Dempster-Dumpster System, one truck-mounted Dempster-Dumpster accomplishes more than several conventional dump trucks. You eliminate trucks standing idle. You eliminate re-handling of materials. You eliminate loading crews. You increase efficiency, sanitation and good plantkeeping with this Dempster-Dumpster System—the lowest cost method of bulk materials handling ever devised.

It's like having one truck with scores of bodies. One truck-mounted Dempster-Dumpster serves scores of detachable containers. These containers range from 2 to 21 cu. yds. capacity for use with recommended type Dempster-Dumpsters. Each container is designed to suit the materials to be handled—be they solids, liquids, dust, bulky, light or heavy. You simply place these containers at convenient materials accumulation points outside or inside buildings. As each is loaded, it is picked up, hauled and dumped (or load set down intact). Entire operation is handled by hydraulic controls in cab by only one man, the driver.

The list of manufacturers using the Dempster-Dumpster equipment reads like the "Who's Who Among the Nation's Leading Manufacturers". We mention this simply to point out that dozens of the nation's oldest and most successful firms use the Dempster-Dumpster System because of its efficiency and tremendous savings. Write to us now for complete information. Manufactured exclusively by Dempster Brothers, Inc.

Representatives in principal cities throughout the United States, Canada and foreign countries. There's one near by to serve you promptly.

DEMPSTER BROTHERS, 5114 N. Knox, Knoxville 17, Tennessee

For more details circle No. 47 on Reader Service Postcard

Sales jobs films can do

Same intimacy, attention, and impact as television for industrial advertisers

INDUSTRIAL advertisers may not be able to use television . . . yet, but they have its equivalent in the commercial film, which establishes the same intimacy, commands the same attention, and carries the same eye-and-ear impact.

This is the claim of Bernard D. Cirlin, president of Audience Tested Advertising, Inc., Los Angeles, who has developed a definite formula for selling with celluloid. Cirlin's approach differs from that of the typical producer in that he designs each film as an industrial tool and then follows through by helping his client use it properly.

There are two factors in the successful use of film: One is knowing what to put in the film; the other is knowing how to get the most out of it. Although every film is geared to its sponsor's own problem, A. T. A., Inc., thinks it should cover:

1. The product's importance to the audience the film is addressing.
2. Superiority of the sponsor's line, including technical explanations.
3. Items in the sponsor's line, shown in actual use.
4. Their ease and economy of installation and/or use.
5. A visual image of the sponsor's plant, personnel and precision methods.

To get the maximum value from a film, the Los Angeles agency head recommends:

1. Pre-testing it to make sure it puts across its message.
2. Building it up in the salesmen's eyes (because it can be a real shot-in-the-arm for their morale).
3. Insisting that salesmen be aggressive in arranging showings (for the film is both a door-opener and a device for gaining 15 to 20 minutes of the customer's undivided attention.
4. Letting each salesman show the film 20 or 30 times, so that he will come to memorize the carefully worded sales talk (for one of the most important aspects of the film is its on-the-job training of salesmen).
5. Promoting the film in advertising and creating a demand for it; having loan prints available and encouraging customers to show it to their customers.

One client, happy to vouch for the success of this formula, is Sam Beber, president of Marvin Manufacturing Co., Los Angeles, makers of recessed lighting and ventilating fixtures. His firm, known as Marco, credits much of its recent sales gain to an eight-and-a-half minute color film which Cirlin produced last year.

Formula in action

So to see the formula in action, let's watch this film as it unfolds on the built-in, TV-size ground-glass screen of the salesman's portable projector . . .

Scene 1. "THE MARCO STORY." Main credit titles, to orchestral music.

Scene 2. Shots of street crowds celebrating, intercut with newspaper headlines, "War Ends!" *Narrator:* "Remember V-E Day? and V-J Day? . . ."

Scene 3. Shots showing new construction. *Narrator:* " . . . and the building boom that started almost on the day the shooting stopped? . . ."

Scene 4. Shots of interiors in typical tract homes. *Narrator:* " . . . with latest, most up-to-date features . . . This was the House of Tomorrow—almost. Almost, that is, because in that first year after the war, the House of Tomorrow was still using yesterday's lighting."

Here is part of the formula: to build interest by an indirect approach, and at the same time to set the stage logically for the sales story to follow. The discussion has now centered on lighting, but there is still no mention of Marco.

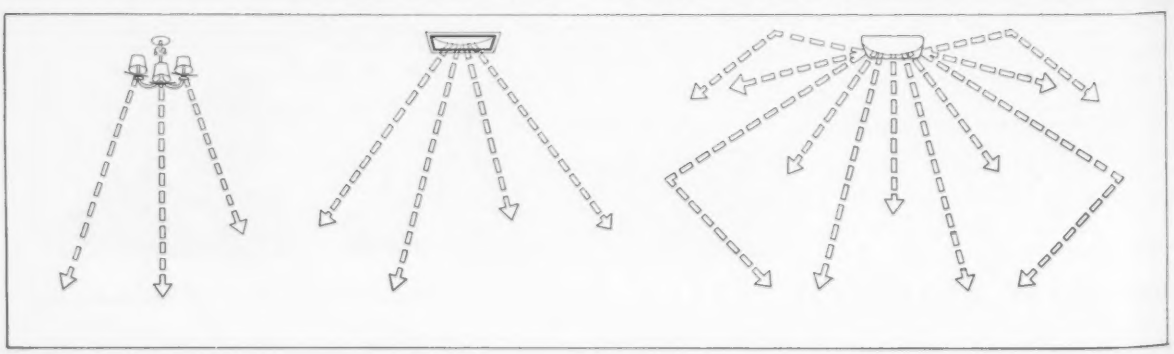
Scene 5. Shots of modern but ugly drop fixtures. *Narrator:* " . . . and the same old drop fixtures, with a few strange new bends and angles here and there, perhaps to look new . . ."

Scene 6. Girl in nightgown turns on recessed bedroom light. *Narrator:* " . . . a few houses did have modern lighting—recessed or flush light, that is . . . "

Scene 7. Three shots of old style recessed lights, lenses flush with ceiling. *Narrator:* "But it wasn't too satisfactory . . . designing failed to take into consideration the problems and cost of installation."

In these scenes, the cameraman was working as hard as the narrator. Shots were angled to show off the clean ceiling lines of recessed lights, in contrast to drop fixtures, but also to point up the lack of light spread from flush

ANIMATION ART shows how three types of fixtures light the same room. LEFT: Old-fashioned chandelier. CENTER: Flush-lens recessed. RIGHT: Drop-lens recessed. Animation technique is backed up by photographic sequences showing differences in types of fixtures.



"Of all the greases we've tried... UNOBA holds up best."

"Of all the greases we've tried in the bottle shop of the Blitz Weinhard brewery UNOBA holds up best.

"We proved UNOBA'S superiority in extensive competitive tests involving such machines as our Meyer bottle washer, Ermold labeling machine, Cemco 50 bottle filler, Continental Can Co. seamer and in the Meyer pasteurizer pictured here.

"This pasteurizer has three roller chains which must be kept well lubricated under quite difficult conditions. During an eight-hour shift these chains move 116,000 stubbies of beer through the widely varying temperatures of the pasteurization process. A severe test, but here as elsewhere throughout the brewery... UNOBA *holds up best.*"

If moisture and temperature variations create lubrication problems in your plant we suggest that you do as Mr. Mitlehner of Blitz Weinhard did. Have your nearby Union Oil representative supply you with UNOBA, the remarkable barium-lithium base *multipurpose* grease.

Erwin Mitlehner, superintendent of bottle shop, Blitz Weinhard Co., Portland, Oregon

UNION OIL COMPANY 76
OF CALIFORNIA

Los Angeles: Union Oil Bldg. • **New York:** 45 Rockefeller Plaza • **Chicago:** 1612 Bankers Bldg. • **New Orleans:** 644 National Bank of Commerce Bldg. • **Atlanta:** 401 Atlanta National Bldg. • **Kansas City, Mo.:** 921 Rialto Bldg.

For more details circle No. 48 on Reader Service Postcard

lenses. The scene was now set:

Scene 8. Exterior of Marco plant, name visible; activity: truck being loaded, etc. *Narrator:* "But then Marco appeared on the scene . . . "

Scene 9. Shots of construction projects, Marco men (identified by name on briefcases) conferring over blueprints, etc. *Narrator:* "Marco men went out into the field, talked to architects, engineers, builders, and contractors . . . And by meeting their needs and solving their problems, Marco revolutionized the recessed lighting field."

That's a big statement. To substantiate it, Cirlin turned in the next two scenes, to the costly but lucid device of animation, showing the direction taken by light rays.

Scene 10. Light from flush lens animates down. *Narrator:* "Old style recessed light, with its flush-type lens, gave no ceiling illumination . . . "

Scene 11. Light from drop lens spreads up and out. *Narrator:* " . . . Marco engineers pioneered in the development of the drop lens . . . "

Scene 12. Girl in negligee demonstrates boudoir light, girl in bath towel demonstrates shower light, in hostess gown demonstrates light over bridge table. *Narrator:* " . . . lights styled for every room . . . "

Scene 13. Shots of chrome, brass, and copper finishes on lens frames. *Narrator:* " . . . triple-plated for lasting beauty and durability . . . "

Two objectives accomplished

Notice how the "educational" animated sequences were at once relieved by a discreet dose of sex, followed in turn by a straight commercial. The film has now accomplished its first two objectives of posing a problem and showing how the product solves the problem. Installation is the next topic, approached with another camera technique: shooting in stop motion.

Scene 14. Fixture appears to install itself while narrator discusses features.

Scene 15. Light distribution curve appears briefly as narrator mentions that these are available.

Scene 16. Same as Scene 14. Narrator concludes discussion of features.

Scene 17. Electrician eating sandwich. *Narrator:* "To demonstrate the saving in time . . . we've chosen a typical journeyman electrician . . . "

Scene 18. Finishes sandwich, polishes union button. *Narrator:* "This is Joe Juicer . . . "

Scene 19. Joe starts whirlwind installation, stopped by a held frame. *Narrator:* "No, no, Joe . . . Stop showing off!"

Scene 20. Full shot of Joe; clock with sweep second-hand appears in corner of screen. *Narrator:* "Now install the fixture as you normally would . . . "

Scene 21. Joe completes installation; clock stops. *Narrator:* "There you have it. A complete installation in X minutes and X seconds . . . "

Stop motion gave the narrator a chance to comment on each of the fixture's time- and labor-saving improvements. After some mild comedy relief, the matter was clinched with a timed demonstration. Two steps remained: to deal briefly with Marco's recessed fan and to give the customer a picture of the company's plant.

The latter point plays an important part in the formula for selling by film. Most customers, Cirlin feels, have little concept of the companies which solicit their business. They may have certain impressions gained from the salesman's presentation and personality, but the film fills a great void by furnishing a visual image of the company. It is perhaps an even better medium than the conducted tour, for the camera can show off the manufacturing operation to best advantage.

Blending the objectives

In this instance, the two objectives are blended by showing the fan in actual production, after a brief plug for the firm's custom lighting department.

Scene 22. Close-ups of machinery. *Narrator:* " . . . equipped to develop your ideas, ready at all times to work with you . . . "

Scene 23. Press stamping fan housing. *Narrator:* "Marco leadership is not confined to recessed lighting . . . "

Scene 24. Worker holds up housing parts.

Scene 25. Worker seam-welds housing parts.

Scene 26. Shot of competitive product. *Narrator:* "Gaps in the housing . . . results in noise and lowered efficiency."

After this view of the factory, the film follows the fan into home.

Scene 27. Girl in kitchen turning on Marco fan.

Scene 28. Close-up of fan as it starts to move.

Next two scenes show a smaller fan designed for bathroom use, then the camera turns on a new filter fan, which

Quality REFRACTORIES

count . . . when the "heat's on"!

For the economy of long service life—you can't beat DFC Hi-Fire Brick laid with DFC Latite air-setting high temperature mortar. Investigate the superior qualities of the full line of DFC Refractories and Refractory Specialties for your next installation.

WRITE FOR CATALOG 801

West Coast Distributor: W. D. Mushet Co., Portland and San Francisco. Dealers in principal cities — see phone book yellow pages.

DFC
The DENVER FIRE CLAY Company
2301 BLAKE STREET • DENVER, COLORADO
SALT LAKE CITY • EL PASO • ALBUQUERQUE

For more details circle No. 49 on Reader Service Postcard

UNITED STATES STEEL AT WORK IN THE WEST—the distinctive Los Angeles Union Passenger Terminal

TEEMING TERMINAL . . . with a framework of steel!

Sixty-eight trains a day begin or end a journey here, carrying more than one million passengers every year.

Completed in 1939, the Los Angeles Union Passenger Terminal combines both beauty of design and the ultimate in operating efficiency. Structural steel, rails, and reinforcing bars went into its construction . . . and a major share came from the mills of United States Steel.

Yesterday, Today, and Tomorrow—Columbia-Geneva has for years helped to fill the steel needs of the West. We hope that when you need steel, you'll continue to look first to Columbia-Geneva, Western producing member of the industrial family that serves the nation—United States Steel.

West's Largest Steel Producer

United States Steel Corporation • Columbia-Geneva Steel Division

SAN FRANCISCO • LOS ANGELES • PORTLAND • SEATTLE • SALT LAKE CITY • DENVER

USS

UNITED STATES STEEL

For more details circle No. 50 on Reader Service Postcard

Butler Manufacturing Co., Richmond, Calif., protects these metal surfaces with Rustmaster.

Prime Metal Surfaces with RUSTMASTER!

Hold down maintenance and replacement costs, as so many other plant managers do, with Rustmaster. This powerful rust inhibitive primer, developed by GENERAL PAINT, halts rust damage to machinery, metal doors, windows and roofs, towers, tanks, elevator cages, structural steel, and other metal surfaces exposed to fog, smog, corrosive fumes, rain and humidity.

Absorbs Old Rust...

Rustmaster literally absorbs old rust by penetrating right down to metal underneath. There it forms a tight bond that prevents new rust from forming on either old or new metals.

Easy to Apply...

Rustmaster can be applied without costly sand blasting or pre-cleaning, wherever such preparation is impractical. Just remove loose rust and scale with scraper or wire brush and apply Rustmaster by brush, dip or spray. Dries dust-free in about 1 hour; ready to handle in 4 to 6 hours; re-coats in 18 to 20 hours with any oil-type exterior finish.

Long-lasting Protection...

Rustmaster won't crack, chip or peel. Expensive yearly maintenance painting is unnecessary — many industrial users report 10-15 years without re-priming.

TRY RUSTMASTER. Write TODAY on your company letterhead for descriptive folder and free sample — enough to paint a garden cart, wheelbarrow or several test boards. Address Dept. 11B.

IM-11

General Paint CORPORATION

P. O. Box 3474, Rincon Annex, San Francisco 19, Calif.

Dealers and Branches Throughout the West and Southwest

Specialized Industrial, Building & Maintenance Paints • Custom Product Finishes
Marine Paints • 5-Star Professional Finishes • Home Decorator Products

For more details circle No. 51 on Reader Service Postcard

narrator describes. Film is now moving to a close.

Scene 32. Stock shots of Super-Chief, S. S. United States. *Narrator:* "It's the same filter used on all the nation's railroads and the finest ocean liners."

Scene 33. Shots of Marco installations in homes, office buildings, etc. *Narrator:* "... and Marco thanks you, architects, engineers, and contractors, for the suggestions and constructive criticism that have made our growth possible."

Scene 34. Close-up of lights, fans, moving past camera.

Scene 35. Exterior shot of plant. *Narrator:* "... Marco lights the way toward a better and brighter tomorrow." Fade out.

The final step

Final step in the production of a film is the one from which Audience Tested Advertising takes its name. The footage in its work print stage, running considerably longer than the final version, is shown to a test audience made up of the kind of people to whom it is addressed.

At this showing the producer learns whether the film puts across its message clearly, the technical explanations are understood, there is too much sales talk, or there are any sequences which drag. Final editing and additional shooting when needed overcome these weaknesses and assure the picture's favorable reception.

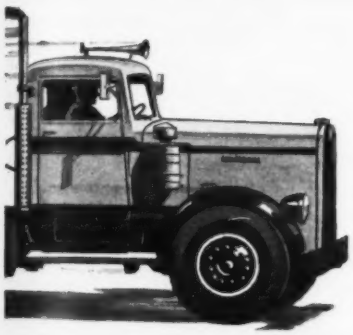
Release of the finished films is usually at a convention, trade show, or other industry event and is supported by trade paper advertising. Cost of a film like "The Marco Story" runs around $1,000 a minute. Additional expense is incurred in obtaining extra prints and furnishing salesmen with projectors.

To Marvin Manufacturing, however, and to such other A. T. A. clients as Pacific Tube, Copper Brite, and Mars Engineering, the cost is returned many times over in increased sales. Customers come to know their supplier for the first time and, oddly enough, begin to take note of products that have been illlustrated in the catalogs all along.

And while this awakening is taking place among customers, something is happening to the sales force, too. Salesmen are speaking with greater knowledge of their product, greater pride in the company behind it. They have forsaken their individual catch-as-catch-can selling methods and are giving a strong, uniform presentation that is in line with the best thinking of management and its advertising-marketing counsel.

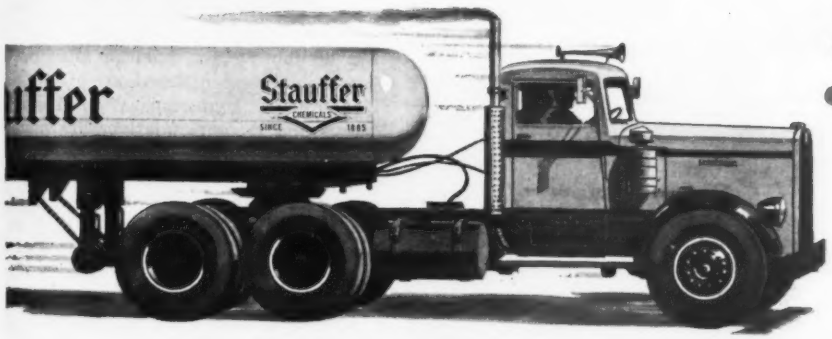
BULK CHEMICALS!

FOR FAST SERVICE, CALL STAUFFER!

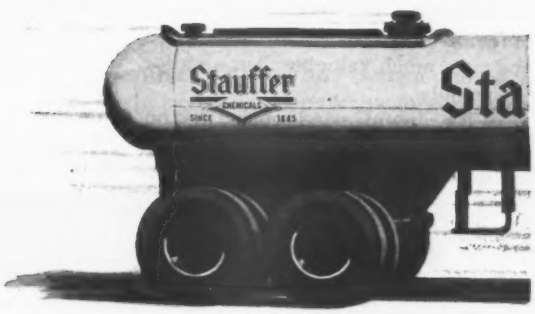


Wherever you may be located in the West, you can depend on the fleet of Stauffer tank trucks to speed your order of bulk chemicals to your plant. In any quantity, at any time—call STAUFFER for all your chemical needs!

- ***Muriatic Acid***
- ***Nitric Acid***
- ***Sulphuric Acid***
- ***Caustic Soda***



STAUFFER CHEMICAL COMPANY



SAN FRANCISCO • NORTH PORTLAND • TACOMA • LOS ANGELES

For more details circle No. 52 on Reader Service Postcard

R-W "Zig-Zag®" Continuous Power Conveyors

An outstanding example of how ZIG-ZAG helps speed production is found in the plant of the television receiver manufacturing division of the Columbia Broadcasting System, Long Island City, N. Y. The system shown, one of seven ZIG-ZAG systems in use in CBS-Columbia plants, carries chassis to the various assembly areas, leaving aisles free.

Television picture tubes being moved from storage to assembly areas in CBS-Columbia plant. Note rigid V-pendant which keeps tube hanging plumb and clear of track in all planes of travel.

"What's your line?"

Whatever it is, you'll find that production is faster, cheaper, more efficient with R-W ZIG-ZAG Continuous Power Conveyors. ZIG-ZAG Conveyors are specially-designed to break materials handling bottlenecks—in transporting materials to, through, and from production lines, and in packaging and loading systems.

ZIG-ZAG carries materials *overhead*... up, down, in, out and around, like water through a pipe. Installation in this manner utilizes previously "dead" space and often releases much valuable floor area for other jobs.

With carrying pendants located on 6-inch centers, ZIG-ZAG is designed to handle any load a man can lift in continuous production. A choice of drive units permits travel at any required speed with variations of 10 to 1 or better. And ZIG-ZAG is easily altered, expanded or relocated by plant personnel, usually without waste of a single part!

Yes, whatever your line is, there's a place for R-W ZIG-ZAG Continuous Power Conveyors to help you boost production. *For full information contact your nearest R-W Engineering Office.*

1880 RICHARDS WILCOX R&W AURORA 1954

SLIDING DOOR HANGERS & TRACK • BIBE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT • INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS •

Richards-Wilcox Mfg. Co.

MATERIALS HANDLING DIVISION

Branch Offices: 900 Santa Fe Ave., Los Angeles 21
666 Mission St., San Francisco 5 • 6903 57th N. E., Seattle 5

For more details circle No. 53 on Reader Service Postcard

PICKING SUPERVISORS by merit

AT North American Aviation the major factors effective in promotion are merit, ability, and capacity. Seniority affects a decision only when all other factors are equal.

Promotions are processed by the Supervisory Selection Board consisting of the following: supervision over the job opening; the division head or his representative; and the director of industrial relations or his representative. For example, in filling a lead man position the Board will first determine all those who wish to be considered for the opening. Their job records, popularity, ability, and leadership are considered both by the Board and by unsigned appraisals of the individual's fellow workers. An objective ranking of the candidates by qualifications of each is made and all candidates considered qualified are then tested.

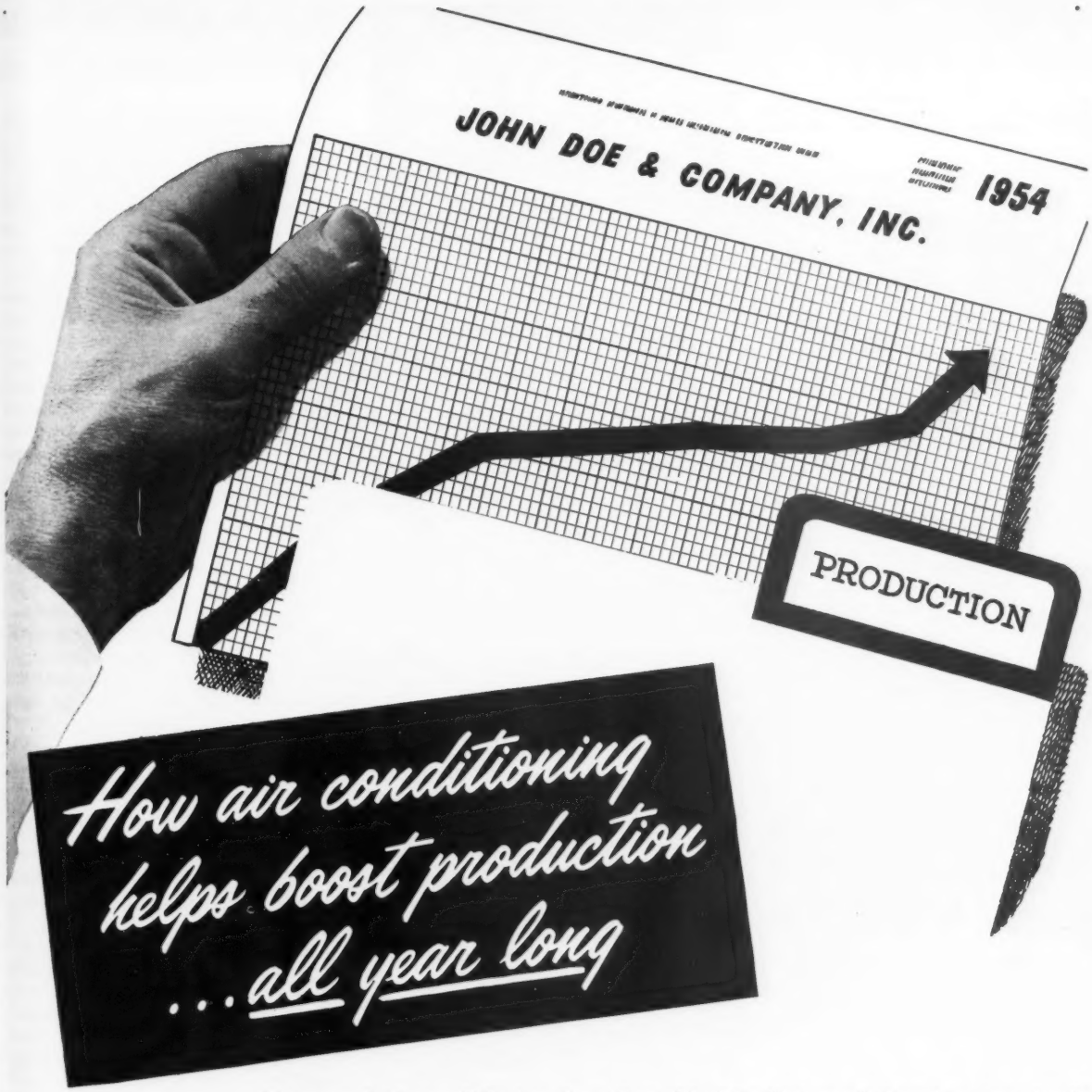
Written tests, scientifically prepared and administered, are given the candidates. A summarization of these tests and recommendations are made on a form listing 19 items which represent the composite list of factors most important in selecting the right men for supervisory positions. The composite form for each candidate is then given to the Supervisory Selection Board for final consideration and appointment.

STUDENT COUNSELING by engineers

A COUNSELING forum for high school students is one of the activities of the San Diego Engineering Council, of which the local section of ASME, ASCE, and AIEE are members. William H. Bond, senior thermodynamics engineer at Convair, is council chairman.

SMALLEST MILL for rolling steel

BETHLEHEM PACIFIC has developed and built for its spectrographic laboratory in South San Francisco what is possibly the smallest steel rolling mill in the West. It is a 3-in. continuous mill with two horizontal and two vertical stands of rolls, and reduces steel samples 5/16-in. in diameter to 7/32-in.



Year-round air conditioning does three big jobs that can help raise your plant's output: 1) It regulates temperature. 2) It controls humidity. 3) It filters the air. You get an endless supply of fresh, clean, conditioned air that helps protect machinery and materials from excessive heat and moisture, and from dust, dirt, and unwanted odors. Result: Fewer mechanical breakdowns, less waste of materials . . . and more and better work from employees, too. Saleable output goes up.

Why not look into the advantages of year-round air conditioning today? It's a good bet the benefits to your business—measured in dollars and cents alone—will more than repay every penny you invest. There are many models to choose from—gas or electric units for heating or cooling . . . electric heat pumps that do both jobs. And with P. G. and E.'s low rates, the one you pick will be cheap to operate.

P·G and E·
Pacific Gas and Electric Company

For air conditioning advice, contact your consulting engineer, contractor, or local P. G. and E. office

For more details circle No. 54 on Reader Service Postcard

Snap-on* MASTER GENERAL SET ½" SQUARE DRIVE

SET 368A-M-B

—covers widest range of wrench operations

By far the widest range of nut turning operations, in both production and maintenance, are covered with this Master Wrench set—½" drive, wrench sizes from ⅜" to 1¼". With this set your men have at their finger tips every combination of handle, adaptor, extension and socket to speed any job in this wrench size. On job after job you get the pay-off of Snap-on's superior speed, flexibility, durability. The sturdy Mechanikit chest has tote-tray and drawers for orderly tool arrangement and safekeeping. Available through your nearby Snap-on branch. For Snap-on industrial catalog and 104-page general catalog of hand and bench tools, write—

SNAP-ON TOOLS CORPORATION
8032-K 28th Avenue, Kenosha, Wisconsin

*Snap-on is the trademark of Snap-on Tools Corporation.

For more details circle No. 55 on Reader Service Postcard

SAFETY PLAN for tool grinding

THE ADOPTION of simple effective safety ideas and the close observance of safety rules appear to be responsible for the fact that the tool grinding section at the Torrance, Calif., plant of The National Supply Co. has not had a disabling injury in more than 10 years.

A large well-lighted and well-ventilated machine tooling area is provided, laid out in such a way as to provide adequate working space for each man and still allow wide, uncluttered aisleways. Equipment and workbenches are kept clean. Adequate facilities for materials handling are provided and all safety rules are enforced. A master exhaust system, with a nozzle on each machine, carries off the considerable volume of dust from the grinding machines, keeping the air in the section clean.

At each machine on which there is an exposed grinding wheel, a metal plate about 2x3 ft., of a concave shape, serves as a shield. These shields are painted a light color to reflect light near the point of operation.

A simple housing encloses each grinding wheel spindle, and additional safeguards are provided so that only the parts with which contact must be made are exposed. A hardened steel plate, conforming to the recess of the abrasive wheel, is attached to it with four screws, 1/32 in. below the face of the wheel.

A secondary table rest fits closely around the abrasive wheel, covering up openings through which a tool might accidentally be dipped. Operators are required to wear safety goggles at all times when operating machinery. All well known and generally accepted safety practices are followed.

TURBINE COMPETITION with other prime movers

AN EXAMPLE of the versatility of gas turbines is the adaptation by Solar Aircraft Company, San Diego, of a standard gas turbine engine to furnish all or part of its output in the form of compressed air, it was reported at the Society of Automotive Engineers national aeronautical meeting in Los Angeles in October.

Paul G. Carlson, Solar project engineer, asserted in his paper that this is an important step in making turbines commercially competitive with other prime movers.

PALLET SWITCHER reduces inventory

A DEPALLETIZING fork lift truck which can pick up a load and rotate it 180 deg., switching the load from one pallet to another, has been developed by engineers of the Port of Oakland, Calif., and representatives of the Towmotor Corp.'s Oakland branch.

Towmotor used the basic design of its condensed milk inverter. (Condensed milk requires periodic turning to prevent crystallization.) The truck enables the port to return pallets immediately to the shipper.

Its particular importance is where transference of goods from land to water carriers necessitates in-transit storage of goods on stevedoring pallets, as on the Pacific Coast where vast amounts of canned fruits and vegetables are shipped in foreign, intercoastal, and coastwise trade.

Food products come in from the canneries on pallets and are put in a working space in the port area, where the goods are transferred from the shipper pallet to stevedoring pallet by hand labor.

The empty shipper's pallets then have to be sorted, stacked, and stored, awaiting pick-up at some later time by the shipper's carrier.

Saves time and labor

With the new procedure, shippers can cut down on the idle time of their pallets and reduce inventory, and the port has reduced hand labor considerably. With a truck operator and two stackers, 65 to 70 pallets can be switched per hour. The old method took four gangs of four men each for the same amount of work.

The loads as received are overweight for shipside handling, which necessitates skimming of one or two tiers by hand labor to meet the 2,100-lb. regulation limit. This is done immediately after the switching operation and allows the goods to be high-stacked into the transit shed without delay.

Another important advantage is the safety factor, as the load can be mechanically squared up.

Although the new truck is an immediate answer to the problem, the Port would like to see further developments in this field. The real challenge to fork-truck manufacturers is to design a truck which could be used for all phases of port operations—one with adequate adjustment and travel to be used on cotton, petroleum drums, newsprint, and for inverting pallets.

NOW... Another Chrysler First!

Finished Machine Parts of STEEL OILITE

for applications requiring extreme ruggedness, low wear, and unusual ductility.

If you've passed up using metal powder finished machine parts because your applications require units of greater strength and ductility than they normally provide, then you will want to investigate STEEL OILITE.

Here is a new, yet thoroughly proved, metal powder product that is saving users from 35% to as high as 96% over conventionally produced precision finished machine parts

STEEL OILITE Finished Machine Parts provide revolutionary new strength and ductility that makes these big savings practical on countless new applications where component parts need to be especially tough.

Write today for the New Bulletin on STEEL OILITE just published. It's yours for the asking. Please request Bulletin STM-54.

A CHRYSLER OILITE PRODUCT

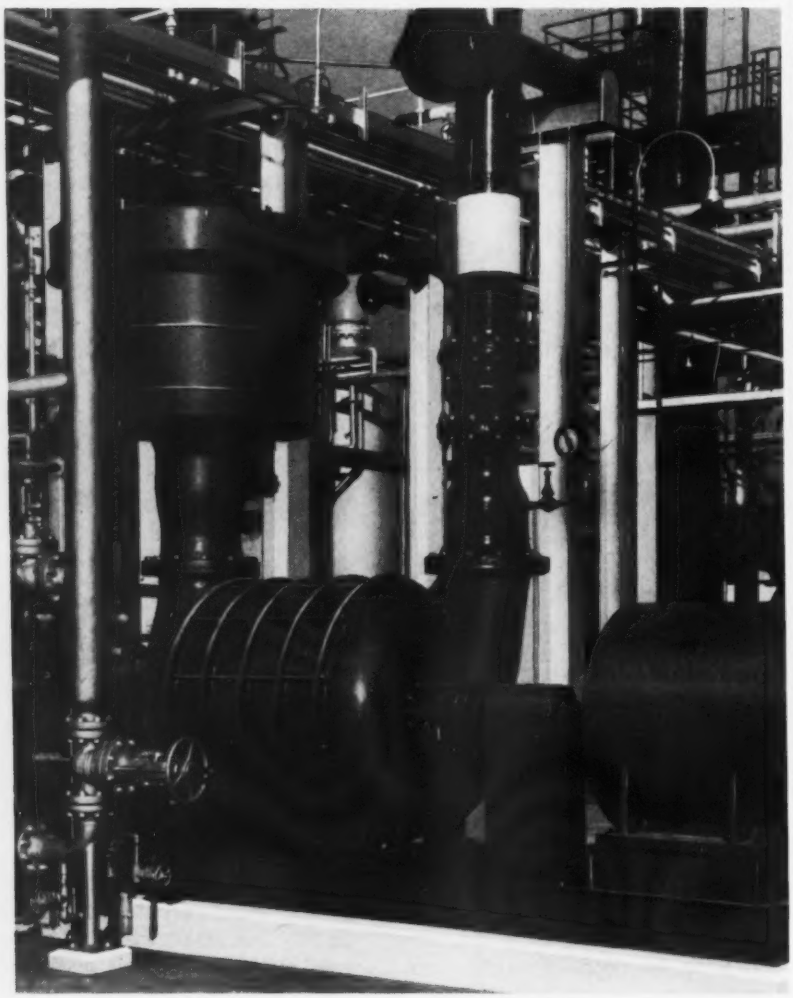
CHRYSLER CORPORATION
AMPLEX DIVISION
Dept. T-11 Detroit 31, Mich.

FIELD ENGINEERS THROUGHOUT THE UNITED STATES AND CANADA

OILITE PRODUCTS INCLUDE: Bearings, Finished Machine Parts, Cored and Solid Bars, Permanent Filters and Special Units of Non-Ferrous and Ferrous Metals and Alloys including Stainless Steel.

For more details circle No. 56 on Reader Service Postcard

Serving
The Industrial Center
Of The West



...The Industrial
Business-Minded Bank

California Bank
Los Angeles

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

For more details circle No. 57 on Reader Service Postcard

GOOD HOUSEKEEPING all year around

A YEAR-AROUND good housekeeping program has been instituted by the Everett Pulp and Paper Division, Simpson Logging Co., Everett, Wash. Thirteen departments are entered in a competition, and the one with the best record each month will have the privilege of flying a "Good Housekeeping" flag.

At the conclusion of each three-month period, the department with the "cleanest house" will have an appreciation prize for each employee in that department. At the end of each year, the winning department will be presented with a Simpson Housekeeping Trophy, which it will keep until the following year's ratings are judged. The contest also provides that each member of the department winning the annual trophy will be eligible for a grand prize.

A racing board has been installed at the plant entrance to keep employees informed how their departments are doing. Department foremen are named along the lower edge of the board, and horses numbered to correspond will be shown on the board.

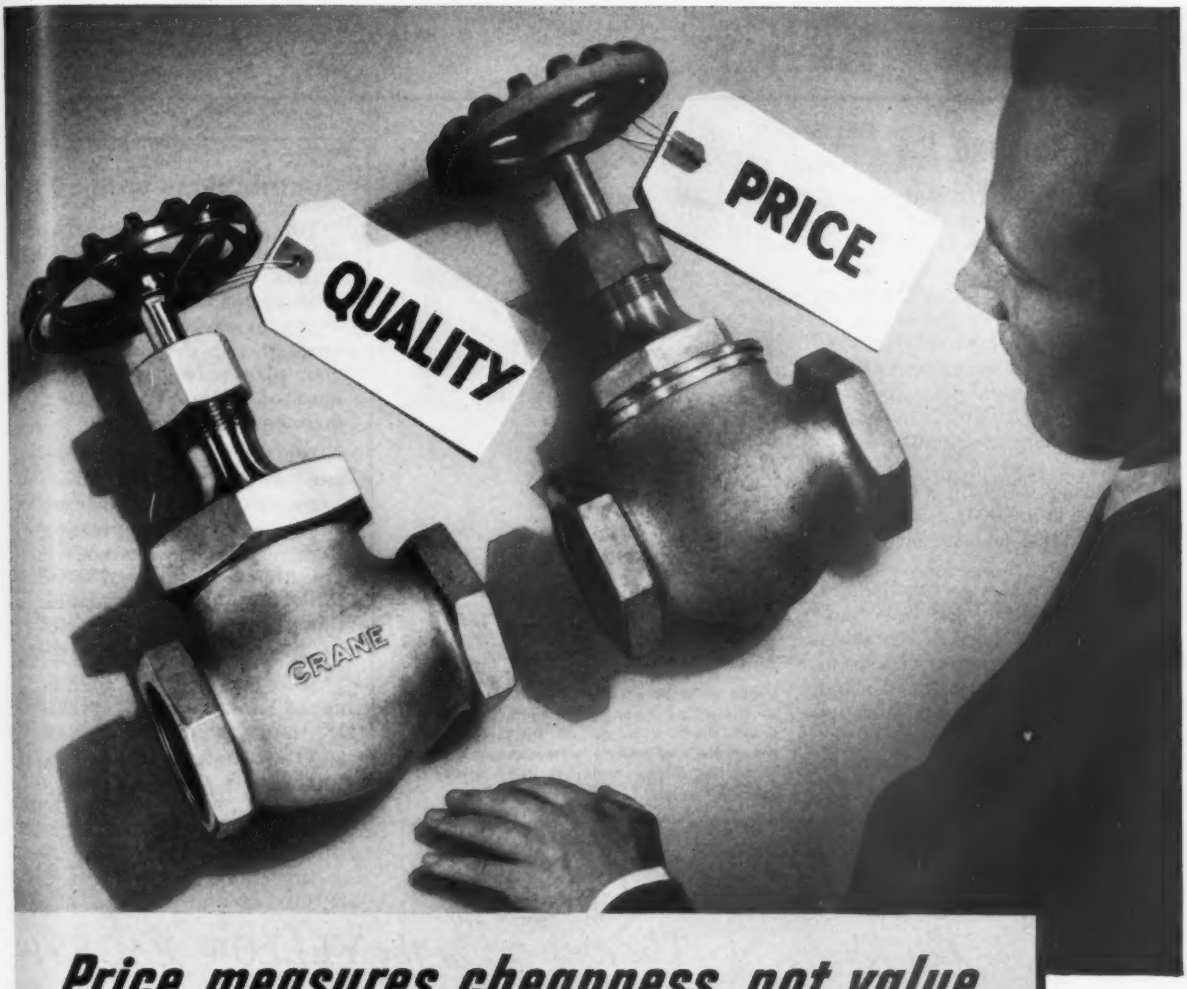
Four inspection teams composed of superintendents, foremen, electricians, and maintenance engineers will determine which departments are doing the best job. The objectives in the campaign are clean and orderly property; reduction of fire and accident hazards; conservation of space, time, materials, and effort; improvement of products and reduction of waste; and keeping good morale.

MORE ENGINE POWER with nitromethane

A 20% BLEND of nitromethane in methyl alcohol will increase the output of a conventional piston engine by as much as 20%, a study by E. S. Starkman, associate professor of engineering at the University of California, reveals.

The reason is not that nitromethane brings more oxygen into the combustion chamber, as had been thought earlier, but that the chemical acts to alter the combusion process so that more energy is released as horsepower than with other fuels.

Nitromethane, which started as a chemical "orphan" without any specific use and later served as a solvent and paint vehicle, was developed as a fuel during World War II, and is now extensively used for rocket fuel.



Price measures cheapness, not value

Everyone nowadays is bedeviled by the higher cost of things . . . so you can't really blame a man for buying on price.

"Save a dollar on a valve here, a few cents there—it all adds up."

But time so often tells a different story, when the dollar *saved* goes out the window in excessive piping maintenance costs. And this can run into a mighty big outlay when you consider the number of valves in a typical plant. Then it's easy to appreciate the great, good wisdom in buying valves and piping equipment of known quality, known dependability.

That's when you become a thrifty buyer—when you buy for value, and not for dubious savings . . . when you buy Crane for the lasting service you get, and the lower upkeep cost.

Crane Co., *General Offices: 836 S. Michigan Ave., Chicago 5, Ill. Branches and Wholesalers Serving All Industrial Areas.*

CRANE

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

For more details circle No. 58 on Reader Service Postcard

EFFICIENCY KINKS

20-TON HOISTING JOB used four lift trucks

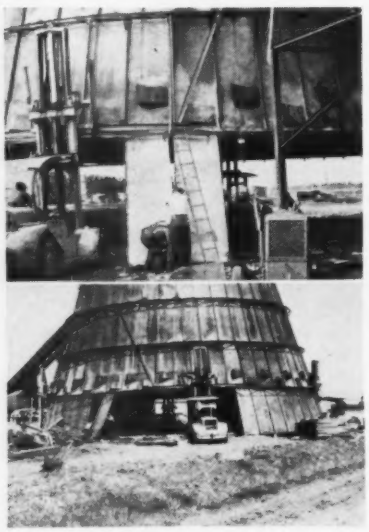
ON-THE-SPOT expansion of the Olson-Ross Lumber Co. burner at Medford, Ore., was made possible with a minimum loss of operating time by an ingenious plan using the company's four Hyster "150" lift trucks.

The four units were positioned at strategic spots around the burner, and the entire 20-ton structure raised 10 ft. while a new course was constructed at its base.

The burner, originally a 60 x 60 ft. model rated at 100,000 bd. ft. per shift, now has a 20% increase in burning area.

Credit for the idea goes to Medford Blow Pipe Co., Inc., and Rees Blow Pipe Co. of San Francisco.

Burners are becoming fewer in number every year, as the demand from pulp mills for wood chips increases and other uses are found for the smaller pieces of lumber. But there are still plenty of burners left.



UPPER VIEW shows start of construction work on Olson-Ross burner at Medford, Ore., with entire structure raised 10 ft. Lower view shows work of adding a new course nearly completed. Burner area has been increased by 20%.

Contributions wanted

For each contribution to Efficiency Kinks which the editors feel merits publication, WESTERN INDUSTRY will be happy to award $5.00. Please send in any details of how your plant solved some problems of design, production, maintenance, or process.

We are particularly interested in ideas that contribute to the efficiency of production and the reduction of operating costs, novel or new methods of pollution reduction and waste utilization, as well as adaptation of old tools and processes to do new jobs.

Send contributions to Efficiency Kinks Editor, WESTERN INDUSTRY, 609 Mission Street, an Francisco 5, Calif.

Trying to "smoke out" local dealers?

The answer's in the YELLOW PAGES!

Ever hear of a dealer without a telephone? Of course not. And to increase his telephone orders he advertises in the "Classified" telephone directory. After all, that's where 9 out of 10 people look when they want to find the folks who sell or serve them locally. The Yellow Pages will help you find the product or service you need and the dealer nearest you.

You'll find it fast in the YELLOW PAGES!

Pacific Telephone

For more details circle No. 59 on Reader Service Postcard

MORE EFFICIENCY KINKS

CARBON SLIDES REPLACE
crane trolley wheels

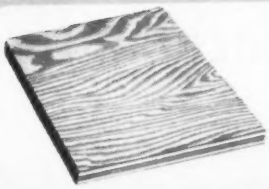
Replacement of crane trolley wheels with carbon slides in special holders at the Electric Steel Foundry, Portland, Ore., has provided maintenance-free operation, the wheels lasting for 12 days. The idea for the carbon slides was produced by John Gooding of ESCO. Cranes not equipped with carbon slides required oiling of the trolley wheels twice a day. Furthermore, during the last two or three days of operating these wheels were out of round, sticking and sliding, causing poor operation of the crane. The carbon slides perform perfectly, 18 to 20 hours a day, making good contact until worn out.

ANGLE CONSTRUCTION
simplified

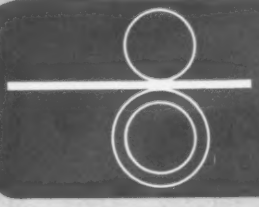
JAMES W. LEWIS of Tech Area Division's ironwork section, The Zia Co., Los Alamos, N. M., received a $15 suggestion contest award check for this money-saving fabrication idea. In most cases the construction of 90-degree angles has required two men, one holding the work and the other welding. In some cases such work is done with the help of templates. Lewis suggested the use of mitre vises, which would enable one man to do much of the work which now requires two. Plans for the construction of a special table incorporating the idea are now being made in the company's ironwork section.

EMPTY CONTAINER
shipping revised

ROHR AIRCRAFT CORP., Riverside, Calif., found that steel banding for tying down empty shipping containers to railroad cars was unsatisfactory due to the extremes of temperature encountered during the movement of cars across the country. The resulting expansion and contraction permitted the load to shift, frequently to the detriment of loading and unloading. Rohr engineers devised a system now being used successfully to tie down the empty containers. Four by four lumber placed over the skid portion of the containers, secured by "J" bolts through the stake pockets of the flat cars, provide the solution. Dunnage between the containers prevents lateral movement.



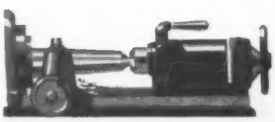
Maas TSP helps make better adhesives for the plywood industry.



Maas TSP makes better degreasing baths for cold rolling of steel.

Maas TSP preserves fruit better prior to cooking at the country's leading packers.

Maas TSP makes cutting oil emulsions better.



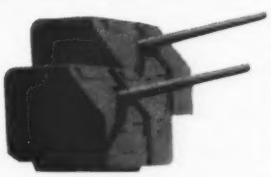
Maas TSP

THE VERSATILE PHOSPHATE

Has many uses in addition to its detergent and soap applications. Know more about Maas. Write for our folder.

A. R. MAAS CHEMICAL CO.
Division Victor Chemical Works
4570 ARDINE STREET
SOUTH GATE, CALIFORNIA

Maas TSP gives cold rubber manufacturers better viscosity control.



Maas TSP gives better performance to gun recoil fluids.

For more details circle No. 60 on Reader Service Postcard

Here's the Helper Your Big Reproduction Machine Needs!

Model 100 only $495.00

Specification Sheets, Check Prints and Engineering Changes Reproduced When You Want Them!

Here's the compact, low-priced machine you've been looking for to speed up reproduction work in your company. Put it in your central reproduction department or right in the department where the originals are made or filed. Either way it will save you time, money, and inconvenience when you need prints of smaller size originals.

The new Copyflex Model 100 has an 11-inch printing width. It operates up to 12 feet per minute and reproduces up to 300 copies in one short hour at a cost of less than 2c each.

Like all Bruning Copyflex machines, the Model 100 is clean, quiet and odorless. No ammonia or ozone vapors. No installation problems. It is so compact you can locate it anywhere and anyone can operate it.

Find out for yourself how this versatile, wonderfully convenient Model 100 can help you save time and cut costs on smaller-size reproduction work. Mail coupon today!

BRUNING
Copyflex

Copies anything drawn, printed, written, or typed on ordinary translucent paper—in seconds.

Charles Bruning Company, Inc.
4700 Montrose Ave., Chicago 41, Ill., Dept. 320
Please send me more information about the Bruning Copyflex Model 100.

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

CHARLES BRUNING COMPANY, INC. • 4700 MONTROSE AVE. • CHICAGO 41, ILL.

Branches in San Francisco, Los Angeles, Seattle, Portland.
For more details circle No. 61 on Reader Service Postcard

METALLURGY SESSION
Gap between research and application bridged

THE THOUSAND-FOLD discrepancy between the actual engineering load of structural materials and theoretical strength of perfect crystals of metal was pointed out to the Southern California section of the AIME Metals Branch in October by Dr. Earl R. Parker, professor of metallurgy, University of California, Berkeley.

In discussing fundamental processes of plastic flow and their practical implications, he said that dislocations or imperfections in the sub-structure of the metallic crystal and their behavior are capable of explaining much of the discrepancy.

Plastic flow resulting from strain application introduces defects in the lattice such that dislocations tend to accumulate in specific planes, referred to as boundaries. The presence of discontinuities such as second phases, precipitation products or inclusions or notches, allows these defects to accumulate, causing resistance to plastic flow and loss of ductibility.

Polycrystalline material is also affected by the multiplicity of slip systems and magnitude of grain size. Creep at elevated temperatures is associated with the self diffusion rate of the alloy atoms.

Still to be solved

A panel discussion at this fall meeting presented several problems of engineering design, application, and production still to be solved. Participants included W. F. Nash, Jr., of C. F. Braun Corp. (chairman), Rebecca Sparling of Convair, E. W. Brady of Aerojet-General, J. L. Waisman of Douglas, and D. Rosenthal and A. E. Flannigan of UCLA.

The first problem was how the seriousness of defects such as notches, inclusions, or cracks can be evaluated in aircraft applications in which the design uses the maximum yield stress available. Related to this was the question of how the effect of the defects could be controlled relative to mechanical properties.

Some of the approaches to these problems: What significance do plastic flow mechanisms have on warpage of fabricated parts upon aging for five years at ambient temperature? How can strain limit be predicted for metal failure when fabricating even simplified parts? What improvement can be made in ductility measuring techniques?

"Industrial management methods for small plants"

55 Years of Advisory
Service to Management

FOR THE FIRST TIME

An Engineering-Management Consulting Service set up especially to assist medium size and small business, patterned from our years of service to the largest organizations here and abroad.

COST

Commensurable with opportunities for achievement. A new building and other facilities designed and constructed for this extended service.

You will find a discussion with us interesting and enlightening. We do not sell service. We explain it. Brochure will be sent.

THE EMERSON ENGINEERS

New York & Los Angeles

G. V. Bain, In Charge
Western Operations

New Headquarters of
The Emerson Engineers
4645 Van Nuys Boulevard
Sherman Oaks, California
STate 9-8231

For more details circle No. 62 on Reader Service Postcard

RELIABILITY PROGRAM ferrets out failures, decreases their frequency

TO INSURE a reasonable overall reliability of 80% on a guided missile with 400 components, only one out of 1,800 of each component can fail, it was pointed out in an article in the May 1954 issue of WESTERN INDUSTRY. The benefits of a reliability program in action were summarized by W. C. Weigel, Chief of Process Control and Reliability, Convair-Pomona, at the Regional Quality Control Conference held in San Diego in August.

Here are examples he cited resulting from reliability studies and analyses of data and tests:

Design failures

Failures and poor performance in a power relay were not due to poor workmanship as suspected, but from faulty design. Now, instead of three to four rejections per unit and extensive testing during manufacture, reliability has been greatly increased with a marked decrease of in-process testing.

Repeated failures in another component proved not to be due to design, but to external factors. Corrections decreased the failure rate to an acceptable level.

Repetitive failures in a number of different electronic components of different design were traced to a particular resistor from a particular manufacturer. In certain other electronic components it was found that certain workmanship errors had crept in. When these were corrected, failure decreased. Failures of certain electron tubes in sub-assembly areas were traced to improper receiving inspection procedures. The circuit design was such that the natural latitude of the tube tolerance could not be accepted. The receiving inspection procedure was corrected and the design changed to allow a wide range of adjustment so that the unbalanced transconductance of the tube ceased to be of importance.

Contamination was determined to be the principal cause of failure with hydraulic units. By constructing a dust-free area and providing carefully specified properties of filters, periodic check of hydraulic test equipment, and oil sample analysis, failure dropped from 75% for this cause to less than 10%, with continued further improvements expected.

Other difficulties were traced to "O" rings. Diagnosis of failures indicated over-age and improper storage conditions and cylinder walls which were rough and not finished properly. Corrections in storage methods and quality control were set up to assure that acceptable "O" rings would be used. Manufacturing now plates and protects the cylinder.

In a particular electro-mechanical unit involving close tolerance which was giving serious difficulty, early indications were that one vendor's product was superior to the unit which had been giving trouble. Reliability analysis proved that there was no real significant difference in expected failure rates between items from different vendors, and indications are that corrections to design have significantly reduced the failure rate. Without the critical reliability analyses, one of the vendor items likely would have been selected in preference to another without a sound basis for selection.

FOR JOBS LIKE THESE YOU NEED

PATENTED
SURETY TURN CUFF INDUSTRIAL GLOVES

In addition to the greater hand and arm protection afforded by Surety's exclusive Turn-Cuff design, you can have Turn-Cuffs in the weight and material—natural or synthetic rubber (Neoprene, Sureseal, etc.)—that will give longest, lowest-cost service on each specific job. Your jobber will help you select the right weight and material, or write

CUFFS UP (see photo above). Liquids can't dribble onto arms, trickle inside gloves.

CUFFS DOWN Two inches longer protective gauntlet.

Western Division, 544 Market Street
San Francisco 4, California

THE SURETY RUBBER CO.
Carrollton, Ohio

For more details circle No. 63 on Reader Service Postcard

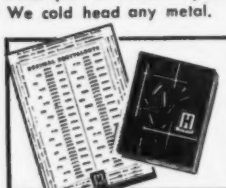
'CHEAPER BY the thousand'

HASSALL SERVICE

HASSALL Cold Headed Parts and Fasteners

Our BIG BUSINESS is making small parts by the thousands . . . cold forged parts which are usually lowest first cost, lowest assembly cost, and strongest for longest service life.

A quotation from us won't cost you a cent but it's very likely to show you a much LOWER COST source of supply for any small metal part or fastener you are using in your product. We cold head any metal.



NEED a good 3 color decimal equivalent chart? Yours without obligation . . . just drop us a card. Complete catalog on request.

Hassall
ESTABLISHED 1850

JOHN HASSALL, INC.
P. O. Box 2186 Westbury, L. I., New York
Los Angeles Representative:
C. W. Warren Co., 646 N. Fuller Avenue, Los Angeles 36, California

For more details circle No. 64 on Reader Service Postcard

WEIGHT-FEEDING for plastic injection

AUTOMATIC weight-feeders in some of the plastics plants in Southern California have paid for themselves in a very short time by savings in materials alone, it was reported at the October meeting of the Southern California Section, Society of Plastics Engineers.

The advantages of weight-feeding over volumetric feeding of plastic injection machines were pointed out by the speaker of the evening, Rubin Klinger. He listed them as elimination of part weight variations, saving of material, and elimination of packing and sticking in the mold, resulting in higher quality of the molded part, fewer rejects, better dimensional tolerances, and less wear on pumps, presses, and molds.

When polysterene came into use, the need for accurate feeding brought forth the automatic equipment, he said.

The possibility of using automatic weight-feeders in preform machines for special thermosetting machines was also mentioned in the discussion.

Tooling for Western Industrial Expansion!

You'll find hundreds of exhibits of tools, machines, supplies, processes and equipment to cut costs and increase your production at the first ASTE

WESTERN INDUSTRIAL EXPOSITION

LOS ANGELES

Shrine Auditorium and Exposition Hall

MARCH 14 thru 18, 1955

TO SAVE YOUR TIME ON ARRIVAL AT THE EXPOSITION, FILL IN AND MAIL THIS COUPON TODAY.

AMERICAN SOCIETY of TOOL ENGINEERS
10700 Puritan Ave., Detroit 38, Michigan

Please mail me an advance registration form for the ASTE Western Industrial Exposition.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

For more details circle No. 66

PROOF*

* **FLAME-PROOF** — Bronco 60 Certified bears the flame-proof approval number P116BM of the United States and Pennsylvania Bureaus of Mines.

* **PROOF OF CONTENTS**—Jacket is *certified* by a registered professional engineer to contain not less than 60% Neoprene by weight.

* **PROOF IS BRANDED**—"...60% Neoprene *by weight*..." is vulcanized into the jacket along with type, size, number of conductors, voltage, and "P116BM" every two feet.

* **OIL-PROOF**—The rich Neoprene jacket of Bronco 60 Certified will not swell and crack when doused in oil.

* **OZONE-PROOF** — Around electric motors and generators Bronco 60 Certified resists attack of ozone.

* **SUN-PROOF**—Rays of the sun can't break it down. In fact, Bronco 60 Certified is proof against all of rubber's natural enemies.

Sold nationally only through leading Electrical Wholesale Distributors

WESTERN INSULATED WIRE CO. LOS ANGELES 58, CALIF.

For more details circle No. 65 on Reader Service Postcard

FILMS AND FILM STRIPS

"The man who sells"

This 10-minute 16-mm. sound film, produced for Chevrolet salesmen, is now available to other business and school groups considering the values and contributions of a sales career. For further information write Film Distribution Dept., The Jam Handy Organization, 2821 East Grand Blvd., Detroit, Mich.

Steel tubing manufacture

A 20-minute 16-mm. sound-color film, "Steel Tubes for Industry," shows actual production of steel tubing and explains with animated sketches what takes place in tube drawing and tube reduction, the two basic methods of cold working raw tube hollows. Film is available to business organizations and schools by writing Pacific Tube Co., 5710 Smithway St., Los Angeles 22.

The home front

"It's Everybody's Business" is a 22-minute color cartoon, which explains with a light touch the mechanics of our business system: profits, investments, competition, advertising, productivity and standard of living. Film is issued by United States Chamber of Commerce and prints may be rented or purchased.

Welding safety

This 20-minute sound slide-film, "The Guy Behind Your Back," has won an Award of Merit from the National Committee on Films for Safety. A training aid for employees using oxyacetylene cutting and welding equipment, the film has an easy style and persuasive humor. Inquiries should be directed to Air Reduction Pacific Co., 220 Bush St., San Francisco.

Handling railroad ties

"Easy Does It" is the title of a new 25-minute color-sound film showing latest methods of handling and distributing railroad ties along rights-of-way. Featured in film is a method of banding ties in tram size lots, using heavy-duty steel strap with patented seal joint developed by Brainard Steel Division, Sharon Steel Corp. Free to interested railroad groups from Brainard Steel Division, Sharon Steel Corp., Warren, Ohio.

Industrial trucks

This is first in a series of educational films on materials handling equipment being produced at the University of Southern California under the direction of J. R. Huffman of the Department of Industrial Engineering and H. E. Farmer of the Cinema Department. A composite of sequences chosen from over 20 films submitted by 10 member companies in the Material Handling Institute, the film is designed as a teaching aid, chiefly for the college level, and will be sold or loaned at nominal rental through the College-Industry Committee on Material Handling Education, Material Handling Institute, c/o Professor J. R. Huffman, University of Southern California, Los Angeles.

FILM DIRECTORIES

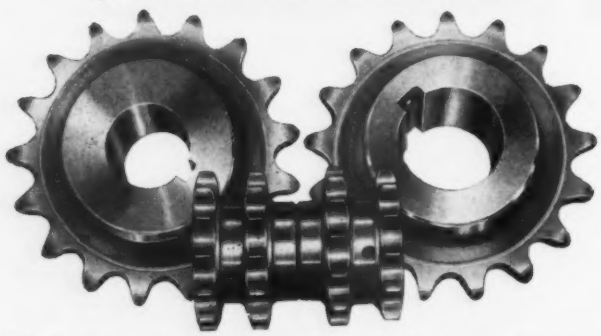
The Department of Commerce has published a series of "film digest catalogs" listing films available to business from industrial, commercial, and government sources, with a separate catalog devoted to each of the following:

Automotive design and equipment
Aviation
Building and construction
Ceramics
Food and food processing
Industrial management and training
Leather
Machinery and machine tools
Maintenance of power units
Materials handling
Metal working
Mining
Packing and Packaging
Plastics
Refrigeration
Safety
Textiles
Time and motion studies
Work simplification
Woodworking

Catalogs may be purchased from the Department of Commerce, Washington 25, D. C., for 50c each, and are also available for use in offices of the Department of Commerce.

NEED SPROCKETS? call YUBA

Sprockets for Mill and Roller Chain



YUBA-Schrock sprockets are flame cut from steel plate. Patented cam-generated action produces sprocket teeth guaranteed to fit standard mill or roller chain with wearing qualities equal to sprockets made by other manufacturing methods. "Special" sprockets with "non-standard" number of teeth readily *cut to order* without penalty charges. Most emergency orders filled in 24 hours.

Phone, write or wire, nearest office NOW for quotations and deliveries.

YUBA DREDGES — PROVED DEPENDABILITY

YUBA MANUFACTURING CO.

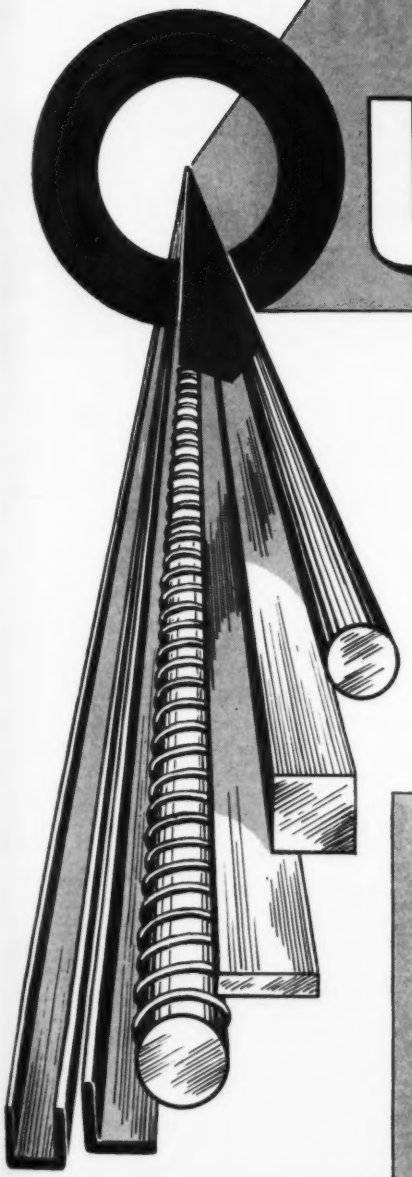
Pulley and Sprocket Dept.

Benicia, Calif. Phone 628 — Stockton Iron Works - Stockton 7-7091

47

For more details circle No. 67 on Reader Service Postcard

QUALITY



HOT ROLLED CARBON STEEL
and
RAIL STEEL PRODUCTS
from
SOUTHWEST STEEL
ROLLING MILLS

HI-BOND CONCRETE REINFORCING BARS

HOT ROLLED CARBON BAR AND BAR SHAPES

WHITE TOP STEEL FENCE POSTS

THE unvarying uniformity of Southwest Steel's quality is the result of modern equipment and complete control from raw materials to finished products—subjected to complete tests and inspection to assure high quality that simplifies production and lowers cost.

Steel surface quality, a major factor in customer acceptance is another important requisite under critical observance at Southwest Steel—for our customers know this careful inspection means fewer rejects—more steel, in effect, for their dollar.

Southwest Steel's unique size and location give customers a distinct advantage: the opportunity for prompt clear answers to your urgent problems.

For further information to your inquiries contact our sales office at LOrain 6-2121, or write—

Southwest STEEL ROLLING MILLS

9901 SOUTH ALAMEDA STREET • LOS ANGELES 2, CALIFORNIA

For more details circle No. 68 on Reader Service Postcard

NEW EQUIPMENT AND MATERIALS

USE RIP-OUT POSTCARD for more information on products introduced this month

101

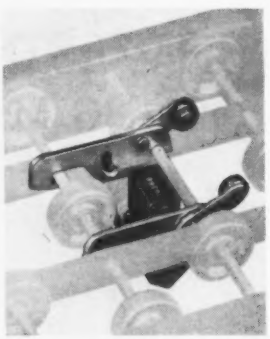
Plastic sealer for pipe lines

Asbestos filled Duron is new material for sealing joints in cement-lined pipe lines—welded, screwed, or flange connected. Because of its fiber content, it does not sag or flow out of joints. Fast-setting chemical action results in hard strong mass with good adhesion to concrete, steel, brick, and tile. *Circle key number on rip-out postcard for bulletin and drawing.* Electro Chemical Englineering and Manufacturing Co.

102

Keeping score

Here's a case counter that gives an automatic check of exact number of cartons or packages passing over a section of gravity wheel conveyor. It fits on Rapistan 12-RS-6 or 12-RS-10 conveyors without rearrangement of wheels and on other models of wheel conveyors 12 or 18 in. wide by removing or rearranging one or two wheels. *For complete information circle key number on rip-out postcard.* Rapids-Standard Co., Inc.



103

Skid-proof surface

Trial kit of Pennsalt Neofloor, new industrial skid-proof surface, containing sufficient materials to surface an area of 30 sq. ft., is made up for sale to plants interested in trying product before stocking large quantities. Kit contains 1 gal. of NeoCoat gray, 1 pint of NeoPrime B, 1 pint of NeoCoat thinner, and 10 lb. of grit. Application of quick-drying liquids is by brush or roller; grit becomes anchored in matrix of neoprene and bonded firmly to floor covered with adhesive primer. Surface is said to be impervious to oils and greases and resistant to fumes, acids, alkalies, and solvents at temperatures up to 220 deg. F. *For additional information, circle key number on rip-out postcard.* Pennsylvania Salt Manufacturing Co.

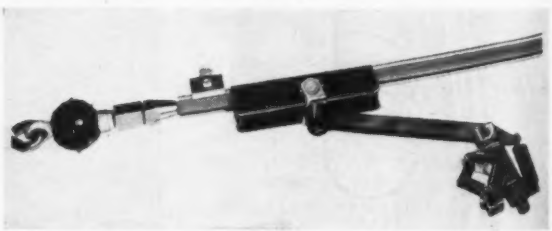
104

Rubber cushion for steel plate

New type of rubber roll for sheet steel pickling operations uses a series of 4-in.-wide rubber rolls rotating on a common, stationary shaft. These advantages are put forward: it is said to prevent scratching of the sheet steel, reduce maintenance costs, simplify roll warehousing, and cost less than conventional skid blocks. Roll construction is especially suited to handle several strands of steel traveling at different speeds across the same roll. *Circle key number on rip-out postcard for more information.* B. F. Goodrich Co.

105

Safe, simple, conductor system



Duct-O-Wire electrification systems for crane and hoist application have the following components (shown here in assembled unit): hard drawn copper wire, rigid vinyl cover, steel clamp, knurled stud, collet type clamp, insulating ball assembly, collector shoe. Regular maintenance man can do installing. Assemblies are self-aligning. Collector shoes, rated at 100 amps, are fully insulated. *Circle key number on rip-out postcard for complete information.* Duct-O-Wire Co.

RUBBER PRODUCTS for industry

Molding, Specialties, Solids, Roll Covering Pipe Lining, Tank Lining, Coatings, Custom Work

Write for free catalog of specifications, applications and prices. Distributorships available in selected areas.

"If It's Rubber, We Can Make It"

Holz Tire & Rubber Co.

1129 S. Sacramento Street • Phone 9-4771 • Lodi, California
Factory Representative: Grether & Grether, Box 47, Stockton, California

For more details circle No. 69 on Reader Service Postcard

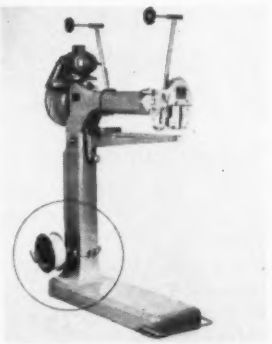
106

Oil circulates in this heater

New automatic oil-circulating heater is claimed to heat heavy fluids and asphaltic materials from three to six times faster than heaters using steam, and to operate at a third less cost. Oil is heated in combustion chamber and by contact with exhaust tube in such a way that when it is working at 400 to 425 deg. F., stack temperature stays under 550 deg. The smallest of four models, all portable, it occupies space of about 4 x 8 ft., 6 ft. high. *For full information circle key number on rip-out postcard.* W. L. Childers Manufacturing Co.

107

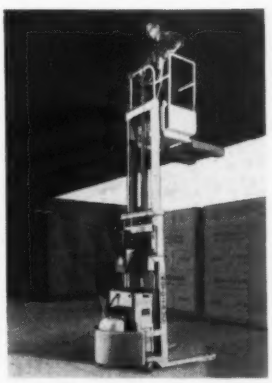
To improve wire stitching



New 50-lb. coil holder mounted on wire stitching machine is claimed to increase production and reduce maintenance by smooth feeding, easy loading. Holder, Model P1C, has pre-lubricated anti-friction ball bearings, sealed from dust and dirt, which require no oiling. *For additional information circle key number on rip-out postcard.* Acme Steel Co.

108

Riding high



New Hi-Rider truck can be used for maintenance operations as well as with a standard Hi-Lift for stacking. Operator controls forward and backward movement or up and down hydraulic lift from top of truck. When lift is over four feet in air, all speeds but slow are automatically cut off. Hi-Rider can be used in aisles as narrow as 4 ft. *For details circle key number on rip-out postcard.* Moto-Truc Co.

109

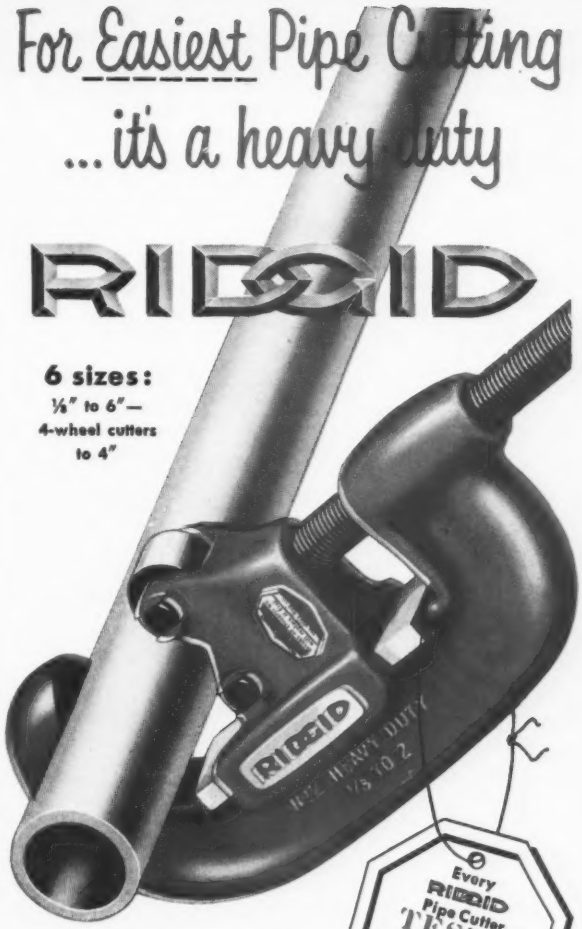
Hard-working roller bearings

LR-U type Tru-Rol bearing has a steel segmented type of cage that provides sufficient strength and accuracy to retain and guide crowned rollers at high speeds. Crowning relieves operational stresses at ends of rollers. Used to support rotor shaft of a Westinghouse 614 MC electric motor (for cranes, hoists, shovels, ore bridges, or conveyors), at the 100 hp. motor's rated speed of 460 rpm., each of two LR-U type bearings has a rated load capacity of 10,500 lb., based on a normal life of ten years' service at 40 hr. per week. *For further information circle key number on rip-out postcard.* Rollway Bearing Co., Inc.

For Easiest Pipe Cutting ...it's a heavy duty

RIDGID

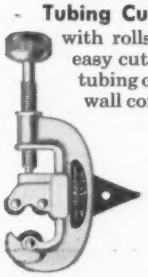
6 sizes: ⅛" to 6"— 4-wheel cutters to 4"



Cut more pipe with less work with a RIDGID

Once you've put a RIDGID Cutter on a pipe and seen how easily and cleanly it rolls through the metal, you won't want any other kind. Smartly balanced for easy action. Tracks perfectly—and special warp-proof malleable housing keeps it that way. High alloy thin-blade or heavy-duty cutter wheels, practically no burr. For fast cutting with least effort, ask your Supply House for a RIDGID.

RIDGID Tubing Cutter with rolls, fast easy cuts, any tubing or thin wall conduit.



3 Sizes for ⅛" to 2⅛" tubing

THE RIDGE TOOL COMPANY, ELYRIA, OHIO, U. S. A.

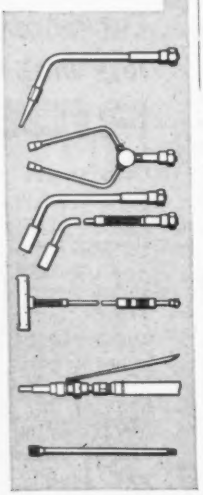
RIDGID Work-Saver Pipe Tools

For more details circle No. 70 on Reader Service Postcard

Cutting with VICTOR Model 300 Series Torch Butt and Model 2450 Cutting Attachment; cuts to approximately 8"

* Buy Victor and get Torch Versatility

The versatility of VICTOR torches means you can buy exactly what you need for today's job, then add other nozzles, tips and attachments as required. Your equipment grows with your needs; stays custom-fit to your work. For example, here are a few of the 34 standard attachments for VICTOR 300 Series Torch Butts.



Welding . . .
Here's one of 10 standard single-tip nozzles available for general welding and preheating.

Heating, Brazing . . .
You have your choice of 11 standard multiple-tip or multi-flame nozzles for preheating, brazing, silver soldering, etc.

Descaling, Flame Priming . . .
Save time and money with VICTOR attachments that fit your exact needs.

Automatic Gas Saver . . .
Shuts off welding gas, keeps pilot light on, saves as much as 75% of total gas consumption.

Nozzle Extensions . . .
Let you handle hard-to-reach jobs, keep you

Start *right*. Buy the versatile VICTOR torch that grows with your job. See it at your VICTOR dealers *today* . . . or write NOW for Catalog 20.

16

VICTOR EQUIPMENT COMPANY VICTOR for welding

Mfrs. of welding & cutting equipment; hardfacing rods; blasting nozzles.

844 Folsom Street, SAN FRANCISCO 7 — 3821 Santa Fe Ave., LOS ANGELES 58

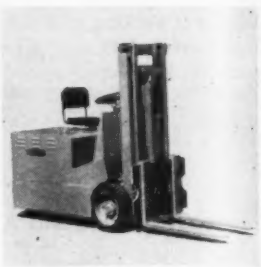
For more details circle No. 71 on Reader Service Postcard

NEW EQUIPMENT

. . . Begins on page 88

110

Sit-down fork truck



Yank Model 630, a 6,000 lb. capacity sit-down fork truck, has these improvements: higher maximum fork elevation, increased travel and hoist speeds, shorter turning radius, and right-angle stacking in narrower aisles. Greater operator comfort is provided by cushioned seat and convenience of controls. *For further information circle key number on rip-out postcard.* Mercury Manufacturing Co.

111

For measuring industrial liquids

Two new high-pressure Xacto meters are designed to give positive displacement accuracy on industrial liquid measuring jobs which require high-pressure applications. Model Fig. 470-15-4 is rated at 15 gpm. and has working pressure up to 500 psi.; model Fig. 470-50-4 is rated at 50 gpm. with working pressures up to 500 psi. Working parts are stainless steel, hard carbon bearings, and Teflon pistons. Both meters may be equipped with straight-reading, totalizing, or ticket-printing dials. *For complete data circle key number on rip-out postcard.* Bowser, Inc.

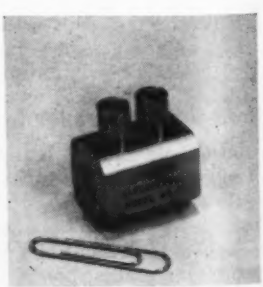
112

No bolting, no welding with these racks

Adjustable storage racks are easy to assemble and dismantle. Cross-bars lock into slots on uprights, which are a minimum of 4 in. apart, for safe storage or light or heavy materials. Height of rack space is adjustable. All-welded steel construction. *Circle key number on rip-out postcard for details.* Palmer-Shile Co.

113

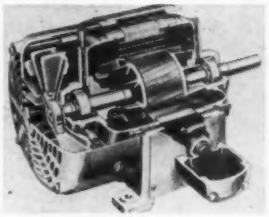
Pressure transducer



New Model S-3 pressure transducer is designed for use with a wide variety of recording and telemetering systems. It is said to be especially suited for transient and high frequency pressure measurements; and because of its small size, low temperature shifts, and small hysteresis, Model S-3 has advantages for many static and slow response applications. Fabricated from invar (iron-nickel alloy), gage is resistant to corrosion. Withstands pressure overloads in excess of 2000% without zero shift. *For details circle key number on rip-out postcard.* Ultradyne Engineering Labs., Inc.

114

Motor for dangerous service



This motor, specially designed for chemical services, is totally enclosed and corrosion protected. Designated Types SD and SE and produced in ratings from 3 to 150 hp., motor is shown here in cutaway view. *You may request copy of bulletin which describes motor in detail by circling key number on rip-out postcard.* U. S. Electrical Motors.

115

Two-way saw blade

New saw blade, featuring completely new tooth design, can cut in either direction of rotation, hone itself, and has 50% harder cutting edge. Two-way blade is used in one rotation until cutting edges become dull. Blade is then reversed in saw, and as saw operates, sides of teeth dulled in original rotation of blade are automatically honed to new sharpness. Company states to equal cutting life of new blade, conventional type blade would require about three resharpenings. *For catalog pages with full information on two-way blades circle key number on rip-out postcard.* Skil Corp.

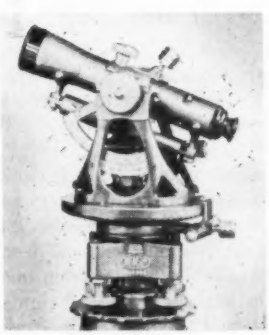
116

New cable accessories

Soldersealed potheads meet need for highter seals due to tendency toward freer-flowing oils in potheads and cables and more severe load-temperature cycles. Available in single conductor, outdoor type, 15,000-46,000 v., all conductor sizes, for use with single- or three-conductor cable. *For more information circle key number on rip-out postcard.* Anaconda Wire & Cable Co.

117

Dustproof, wearproof



Brunson Model 65 builder's transit-level has advantages of construction and accuracy which, manufacturer states, have up to now been limited to engineer's transits costing nearly three times as much. Some of its features are dustproof ball-bearing center and telescope axis, sealed in with special silicone grease, close tolerances and special lubrication that makes it practically wear proof; free operation at temperatures from minus 70 deg. to plus 160 deg. F. *For details circle key number on rip-out postcard.* Charles Bruning Co.

Colson® Precision-Built Factory Trucks

Save Time, Money and Effort

Whatever *your* materials-handling problem there's a COLSON truck, standard or special, to meet your needs—exactly. Write us or, better still, consult the yellow pages (under "Trucks—Industrial") for the COLSON office near you.

Famous Push-E-Z Platform Truck fully loaded starts and rolls with half the effort required by the average truck. It's the strongest hand truck ever built! Capacity 6000 pounds with metal or molded plastic wheels, 3000 pounds with cushion tread, rubber tires.

The COLSON Universal Drum Truck is the answer to fast safe handling of drums and barrels. It locks any size container between adjustable chimb hook and pick-up tips, lifts it easily and carries it with the weight evenly balanced over the wheels.

The COLSON Lift-Jack System easily doubles the efficiency of conventional hand trucks. Handling goods through production, in and out of storage, on and off freight cars or trucks, it lets one man *easily* do the work of two!

THE COLSON CORPORATION
ELYRIA, OHIO

Casters • Hand Trucks • Lift Jack Systems
Hydraulic, Electric and Mechanical Power Lifts and Transports

Mail Coupon Today

The Colson Corporation
Elyria, Ohio

Please send free booklet "Colson Materials-Handling Trucks"

Name_____

Company_____

Address_____

City_____ Zone____ State_____

For more details circle No. 72 on Reader Service Postcard

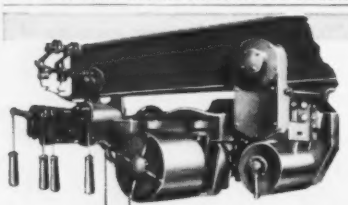
KEEP DOCK TRAFFIC
ON THE MOVE!

WITH
MAGLINER DOCK BOARDS!
DON'T LET SLOW LOADING
BOG DOWN YOUR OPERATION!

To speed loading operations and reduce dock handling costs, this prominent motor freight carrier standardized on Magliner Magnesium Dock Boards. Magliners are being specified by an ever-growing number of freight handlers because they are designed to keep dock traffic on the move! These lightweight, all-magnesium units are engineered specifically for *your* dock conditions . . . your equipment and loads . . . your operational requirements! Magliner dock boards provide safe, dependable, and economical long-life service. It will pay you to get the facts!

MagLiner MAGNESIUM DOCK BOARDS
FOR RAIL OR TRUCK
WRITE TODAY FOR DB-204

MAGLINE INC. P.O. BOX 402 PINCONNING, MICHIGAN
In Canada: *Magline of Canada Limited, Renfrew, Ontario*
For more details circle No. 73 on Reader Service Postcard



move it overhead with
ELECTROLIFT

Materials will move faster and with less waste motion when you move them over crowded aisles with ElectroLift worm drive hoists. Any ElectroLift will quickly pay for itself in savings in time, power, labor and reduced accidents.

Built for long, profitable and trouble-free service, the ElectroLift hoist is available in a wide variety of models up to 6 tons capacity with optional pushbutton control.

Get all the facts on ElectroLift by contacting your ElectroLift representative listed in your telephone directory.

ElectroLift, Inc.
204 Sargeant Avenue, Clifton, N. J.

2178

WORM DRIVE ELECTROLIFT HOISTS

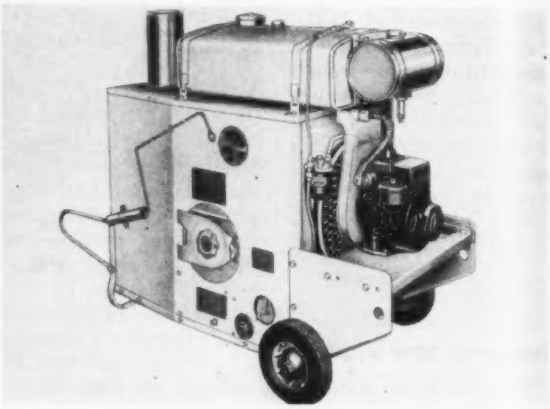
For more details circle No. 74 on Reader Service Postcard

NEW EQUIPMENT

. . . Begins on page 88

118

Adaptable air heater



New "Herman Nelson" portable air heater can be converted in minutes from electric motor to gasoline engine power, using special conversion kit. This means heater can be used in locations with or without electric power, supplying 75,000 to 425,000 Btu. of clean heated air, without danger from fire. Optionally oil- or gasoline-fired when used with engine. *For more information, circle key number on rip-out postcard.* American Air Filter Co., Inc.

119

Industrial fire truck with punch

Here is a truck that can negotiate factory aisles with ease and uses the high-pressure fog method of fighting fires found in full-size municipal type fire trucks. With 1/10 the volume of water discharged under ordinary pressure, high-pressure for apparatus is effective against fires in oil, gasoline, lacquers, solvents, and other flammable materials except magnesium. Truck has 300-gal. water tank, said to be enough for 20 minutes of normal fire fighting, and is also equipped to pump water from plant water lines or from pond or cistern. Powered by 98-hp. industrial engine, 4-ft. wide truck has turning radius of less than 15 ft., travels up to 25 mph., and has a "bucking head" for pushing through blocked aisles. *For further information circle key number on rip-out postcard.* John Bean Division, Food Machinery and Chemical Corp.

120

Safety step ladder

Roll-Ezy step ladder has smooth running, swivel type, spring loaded casters, which make it easy to push or roll from place to place. Weight of the person using it compresses springs on casters, so that ladder rests squarely on four rubber tipped feet. Available in sizes from one to eight steps, in heights from 12 to 72 in. *For complete information, circle key number on rip-out postcard.* M. E. Canfield Co.

121

Safety switch

New Dual-Safety Switch incorporates sensitive mercury control which automatically stops electric current to cooling tower fans when vibration indicates trouble. Faulty fan cannot be started again except by resetting switch after maintenance is completed. In addition, switch assures maximum safety for personnel working in fan stacks, eliminating any accidental resetting. It is operated from cooling tower deck. New control is now attached to each fan on Santa Fe cooling towers and can reportedly be utilized in any existing cooling tower. *For further information circle key number on rip-out postcard.* Santa Fe Tank and Tower Co., Inc.

122

All-in-one blowpipe for welding and cutting

New Prest-O-Lite oxyacetylene outfit for light to medium welding and cutting work in auto repair shops, welding and sheet metal shops, and industrial plants, has a double-duty blowpipe with interchangeable tips. The same blowpipe heats, bends, solders, brazes, welds, and cuts. Prest-O-Lite outfit includes one cutting and three welding tips, oxygen and acetylene pressure regulators, fitted double hose, a friction lighter, goggles, and wrench. As furnished, it welds up to 3/16 in. and cuts through 3/8 in. of solid steel. Additional tips are available for welding up to 3/8 in. and cutting up to 2 in. *Circle key number on rip-out postcard for additional information.* Union Carbide and Carbon Corp.

123

New aluminum tooling plate

Photo shows work done in testing new Kaiser aluminum plate 6061-T66 (new alloy designation). At bottim is hydropress form block made from this rolled and stretched plate; at top is a 24S aluminum part formed on the block. Some advantages claimed for new material: high density and improved yield, greater tensile and compressive strengths as compared with cast plate, and economy. *For details circle key number on rip-out postcard.* Kaiser Aluminum & Chemical Corp.

GIVES YOU ANY RPM—
AND ONLY 14¼" HIGH!

FRACTIONAL HORSEPOWER VARIABLE SPEEDS —IN SMALLEST PACKAGE

4 TO 10,000 RPM
IN RATIOS UP TO 10:1

14¼" HIGH x 8½" WIDE
WEIGHT—87 LB.
EASIEST DIAL CONTROL
SINGLE AND 3-PHASE

TYPE VA
¼ to ¾ h.p.

U.S. MOTORS

Here's the lightweight U.S. Varidrive, Type VA, compactly dimensioned to occupy least space, yet suitable for rugged industrial duty just like the larger HP Varidrive line. Compact dimensions and light weight now make built-in application of variable speeds practical.

QUICK, ACCURATE DIAL CONTROL
Full speed range instantly obtained in less than one turn of dial handle. The stationary dial plate is precisely calibrated for close setting, yet easily visible from a distance.

GETS YOU MORE PRODUCTION
You can greatly increase the performance and output of your machine using fractional horsepower with Type VA. Your operator can control the speed to a split rpm to accomplish better workmanship and to gain more output.

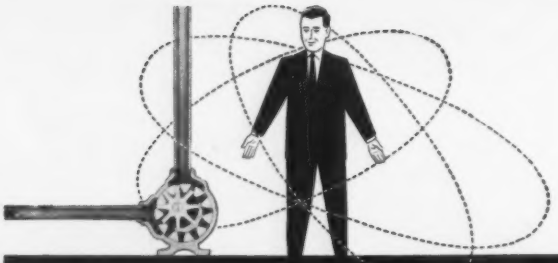
U. S. ELECTRICAL MOTORS INC.
Los Angeles 54, Calif. Milford, Conn.

U.S. VARIDRIVE MOTORS

REQUEST VARIDRIVE BULLETIN

U. S. Electrical Motors Inc.
Box 2058, Los Angeles 54, Calif.
or Milford, Conn.
NAME
COMPANY
ADDRESS
CITY ZONE STATE

For more details circle No. 75 on Reader Service Postcard



YOU'RE SURROUNDED
with products moved
BY VIKING PUMPS

They are everywhere, all around you. The newborn baby starts a life-long series of benefits from Viking pumps. Milk, foods, plastics, soaps, tooth paste, medicines, rubber, paint, gasoline, oils, fuels, fertilizers, asphalt and a host of others . . . all are Viking-pumped.

And so throughout your life, Vikings' influence is everywhere . . . world-wide. For information, send for bulletin 55SA.

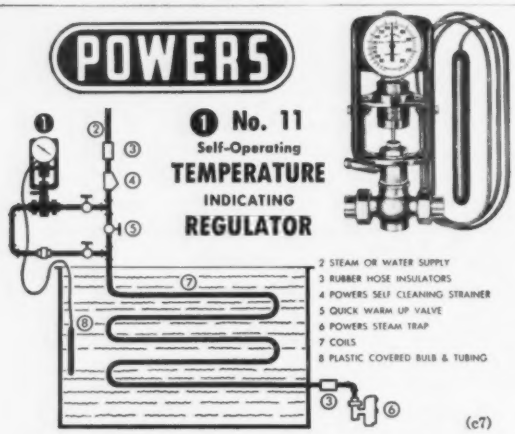
See Our Catalog In SWEETS

Viking PUMP COMPANY
Cedar Falls, Iowa

PACIFIC COAST DISTRIBUTORS
E. E. BURTON, 4432 Long Beach Ave., Los Angeles 58, Calif.
DE LAVAL PACIFIC COMPANY, 61 Beale Street, San Francisco 5, Calif.

For more details circle No. 76 on Reader Service Postcard

POWERS



1 No. 11
Self-Operating
TEMPERATURE INDICATING REGULATOR

For Electroplating and Other Processes

If you want to hold a liquid in a steam heated or water cooled tank or vat at a uniform temperature use a Powers No. 11 Regulator. It is simple, dependable, easy to install and has a 4" dial thermometer. It indicates temperature of liquid being controlled and makes it easy to adjust regulator for various temperatures. For electroplating, thermal bulb and tubing are plastic coated and highly resistant to corrosion. Standard regulators have copper bulb and capillary tubing.

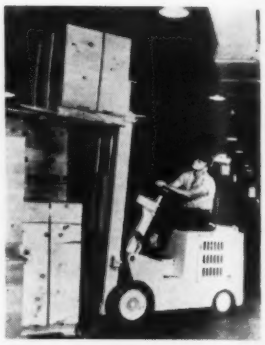
Write for Bulletins 329 and 330
THE POWERS REGULATOR CO.
Skokie, Ill. • Offices in 60 Cities • See Your Phone Book

Over 60 Years of Automatic Temperature and Humidity Control

For more details circle No. 77 on Reader Service Postcard

124

Introducing the FG



New line of gasoline powered fork lift trucks, developed from company's designs for armed forces, feature 130-in. lift, short turning radius, and low initial cost. FG trucks are available in 3,000, 4,000, and 6,000-lb. capacity models; have two speeds in both forward and reverse; are powered by Hercules heavy-duty engines. *For full information circle key number on rip-out postcard.* Baker-Raulang Co.

125

For releasing resin tools from molds

PrEpoxy Partingkote 832-A is a film-forming low-shrink plastic solution applied to molds used in casting epoxy resin tools. It is a ready-to-use material, black in color (to minimize misses or thin area), and may be sprayed or brushed onto mold. Tool surface on removal from mold is said to be clean and smooth. Suitable for plaster, wood, Toolplastik, and metallic molds. *For more information circle key number on rip-out postcard.* Rezolin, Inc.

Industry's Most DEPENDABLE Belt Joints

Proven by use and comparison, Clipper Belt Hooks assure longest service. Made from uniformly high quality, fatigue resisting wire produced exclusively to meet our rigid specifications. For easy application and maximum uninterrupted service, use GENUINE Clipper Belt Lacers. There is a type and size for your needs.

Ask your Industrial Distributor for CLIPPER Products.

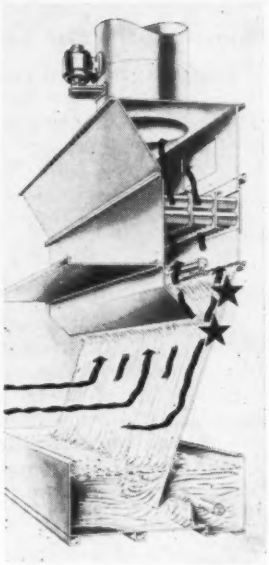
No. 9 Portable Lacer

CLIPPER BELT LACER CO.
Grand Rapids 2, Michigan

For more details circle No. 78 on Reader Service Postcard

126

Water wash spray booth



Spray painting booth, Style "D," is recommended by manufacturer for plants requiring a low-cost, approved exhaust system for general use. Overspray and fumes from painting operations are drawn through two separate washing operations, in which atomized paint pigment and vehicle are deposited in collecting pan. Both wash chamber and collecting pan are accessible for cleaning. Booths come in standard sizes ranging from 4 to 20 ft. in width and from 7 to 12 ft. in height. *For details, circle key number on rip-out postcard.* Binks Manufacturing Co.

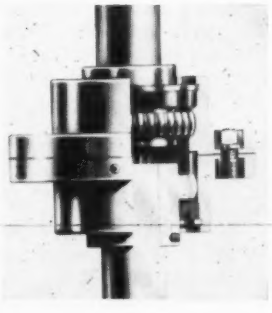
127

Three speeds and 30 feeds on Model 150 Trenchliner

New wheel-type Trenchliner developed by Parsons Co. uses hydraulic control for digging wheel, which travels up and down a vertical mat. Separate hydraulic ram tilts mast to carry weight of wheel forward on the machine for proper balance when traveling, loading, or unloading. Model 150 has range of 30 digging feeds and three speeds on heavy-duty digging wheel, up to 11.25 rpm. Digging capacity is 5¾ ft. deep and 16 to 26 in wide, suited for drainage, pipeline, irrigation, and construction work. *For descriptive literature circle key number on rip-out postcard.* Koehring Co.

128

Sphereflex coupling fights misalignment



This coupling, already used in aircraft and other specialized fields, has gear teeth cut on a segment of a sphere. Whenever misalignment occurs, curved tooth maintains constant area of contact with internal tooth cut with a straight root. Point contact is said to be impossible, and thrust load on bearings cannot develop through coupling. Available from stock in sizes 0 through 6 (maximum bore 6⅝ in.); larger couplings made to order. *For eight-page catalog describing Sphereflex coupling, circle key number on rip-out postcard.* Philadelphia Gear Works.

Now in its 6th year

NOPAK Shelf-Stock Service...

based on these 2 Standard Mounting, Class 1, Cushioned Cylinders

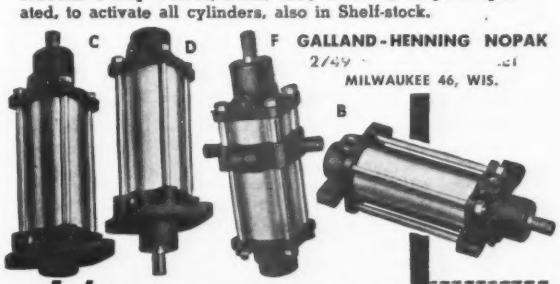
LIST PRICES F.O.B. Milwaukee, Wisconsin

STOCK STROKE LENGTHS — Double Acting Cylinders									
Cyl. Dia. Bore	1"	2"	3"	4"	6"	8"	10"	12"	15"
1½"	24.16	25.72	26.08	26.44	27.16	27.88	28.60	29.32	30.40
2"	26.24	27.88	28.32	28.76	29.64	30.52	31.40	32.28	33.60
2½"	32.36	34.12	34.68	35.24	36.36	37.48	38.60	39.72	41.40
3"	35.04	37.28	37.92	38.56	39.84	41.12	42.40	43.68	45.60
4"	40.84	43.68	44.52	45.36	47.04	48.72	50.40	52.08	54.60
4½"	48.96	51.92	52.88	53.84	55.76	57.68	59.60	61.52	64.40
6"	66.60	70.80	72.20	73.60	76.40	79.20	82.00	84.80	89.00
8"	———	126.80	129.20	131.60	136.40	141.20	146.00	150.80	158.00

By specifying NOPAK Shelf-stock, you buy quality cylinders at the lowest possible prices, you eliminate waiting for "specials", reduce engineering costs. Compare the prices and scope of NOPAK Shelf-stock (1½ x 1" to 8 x 15") with competitive offerings — and you will specify NOPAK.

● Basic mountings "A" or "E" convertible to "B", "C", "D" or "F", (see below) by changing cylinder heads. Add 10% to above prices, (no extra charge 8" bore). ● Piston Rods NF male thread. ● Cushioning can be eliminated on rod, blank or both ends by removing spring and ball-check.

NOPAK 4-Way Valves, hand, foot, solenoid, or pilot operated, to activate all cylinders, also in Shelf-stock.



GALLAND-HENNING NOPAK
MILWAUKEE 46, WIS.

NOPAK
VALVES AND CYLINDERS
DESIGNED for AIR and HYDRAULIC SERVICE

TEAR OUT THIS AD for Reference — or write for extra copies.

A 8003–½

PACIFIC COAST REPRESENTATIVES
Western Machinery Co., 808 Division St., Spokane 11, Wash.
The Willard Engineering Co., 218 W. 28th St., Los Angeles 7, Calif.
Transmission Engineering Co., 53 Stevenson St., San Francisco 5, Calif.
J. M. O'Brien, 32 N. Holman St., Portland 11, Ore.
E. C. Griffin Company, 524½ First Ave. South, Seattle 4, Wash.
John F. Woodhead, c/o Sales Engineering Co., 520 W. 8th St., South, Salt Lake City, Utah

For more details circle No. 79 on Reader Service Postcard

THE MORE KNOW-HOW
YOU PUT IN THE BARREL,
THE MORE PROFIT
YOU TAKE OUT

Useful facts gathered during Oakite's years of experience in barrel finishing are packed in this 10-page booklet covering such subjects as:

PRECLEANING
CUTTING DOWN, DEBURRING
PICKLING, DESCALING, BRIGHT DIPPING
BURNISHING

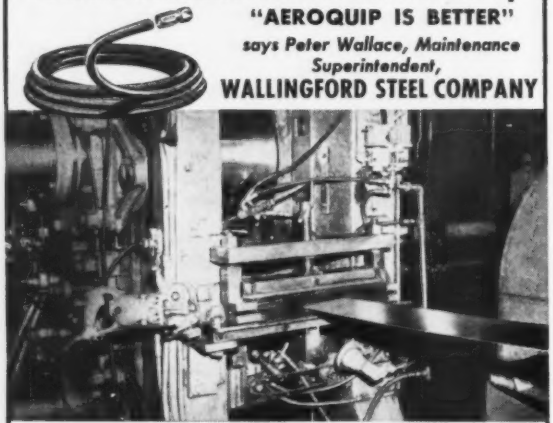
FREE For your copy of the Oakite Barrel Finishing booklet, write to Oakite Products, Inc., 1001 E. First St., Los Angeles, or 681 Market St., San Francisco, Calif.

Technical Service Representatives in Principal Cities of U. S. and Canada

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

For more details circle No. 80 on Reader Service Postcard

"Bulk Hose Method Has Cut Our Inventory"
"AEROQUIP IS BETTER"
says Peter Wallace, Maintenance Superintendent,
WALLINGFORD STEEL COMPANY



Peter Wallace, Maintenance Superintendent, Wallingford Steel Company, Wallingford, Connecticut, says: "Aeroquip is better because of quick installation . . . By stocking several sizes of bulk hose and reusable fittings, I'm able to cut the correct length of hose needed and make a replacement in just a few minutes."

Put this "Aeroquip Idea" to work in your plant. See your distributor or write us for information.

Aeroquip
AERO-COUPLING CORPORATION
(A Subsidiary Of Aeroquip Corporation)
3015 Winona Avenue, Burbank, Calif.
Sales Office and Warehouse for Oregon, Washington and Idaho:
SPARKS-WILLS, INC., 1624 S. E. Grand Ave., Portland 14, Ore.

For more details circle No. 81 on Reader Service Postcard

NEW EQUIPMENT

. . . Begins on page 88

129

Glass-lined water heater

Keystone glass-lined water heater comes in 20-, 30-, and 40-gal. sizes; has new Unitrol control which incorporates 100% shut-off, a magnesium anode rod, and heavy fiberglas insulation. *For information on Keystone glass-lined water heater and Crane line of galvanized water heaters, circle key number on rip-out postcard.* Crane Co.

130

Socketless hose lines

Ease of assembly is an important feature of this new line of socketless fittings and hose suitable for all makes of cars and trucks. Aeroquip kit provides a complete, low cost inventory of fittings and hose, eliminating need for large stocks of ready-made hose lines. This is company's first venture into automotive replacement field. *For information on new hose lines, circle key number on rip-out postcard.* Aeroquip Corp.

131

Cradling loads

Cradle attachment for fork trucks permits reaching into pyramid-stacked rolls to pick up loads not accessible to standard forks. Notches on ends of cradle arms engage a rod inserted through core of roll, and roll is lowered by means of truck's elevator mechanism. Attachment may be ordered in arm length suited to the particular operation. *Further information may be obtained by circling key number on rip-out postcard.* Elwell-Parker Electric Co.

132

Less inertia here

New 3½-in. diameter roller, Model X3509, is offered for use with Buschman conveyors, to assure quicker and easier starting of loads and minimize pitch or incline on gravity conveyors. Because of its design, inertia of roller at rest is more easily overcome. Rollers are made of 9-gauge steel tubing, with 11/16-in. hexagon axles, mounted in 4-in. structural steel channel frame. They are also available in 5- and 6-inch channel and other types of frames. Load rating per roller is 1,000 lb. on level lines and 730 lb. on gravity lines. *For descriptive literature circle key number on rip-out postcard.* E. W. Buschman Co.

133

Crane arms for lift trucks

Buda crane arms provide a time and cost saving method of handling loads where forks or clamps are not available. Offered in sizes of 24, 36, 48, 60, and 72 in., this new attachment for Buda fork lift trucks is constructed of reinforced channel steel, is easily installed, and may be used with or without forks. *For data sheet circle key number on rip-out postcard.* Buda Co., Division of Allis-Chalmers Manufacturing Co.

134

Two-minute changeover for 4-way valves

Here's a new line of pilot operated, solenoid controlled 4-way valves designed to provide all porting and positioning arrangements in circuits up to 3,000 psi. Changeover is made by rotating the solenoid valve 180 deg., which is claimed to cut change over time to only two minutes. Choice of spool types and positioning permits all combinations needed for a wide range of applications. *For complete descriptions and specifications, circle key number on rip-out postcard.* Denison Engineering Co.

135

For handling tin plate

Electromagnetic tin plate holding attachment for fork lift trucks is a new device designed to replace customary clamp, which required manual adjustment by operator and reduced truck capacity. Magnet, placed between forks parallel to fork backs and easily removed for installation of standard forks, is available as an attachment to all new Automatic fork lifts above 1,500-lb. capacity. *For more details, circle key number on rip-out postcard.* Automatic Transportation Co.

136

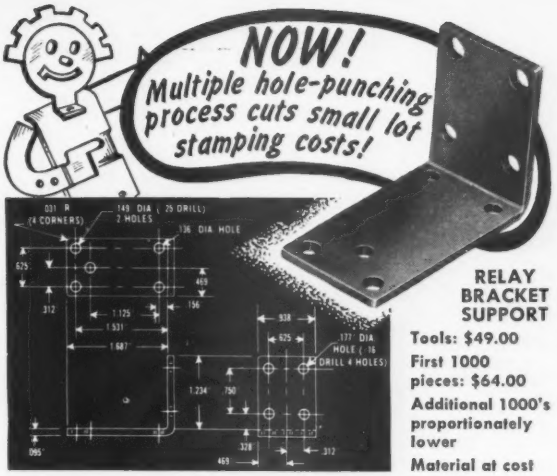
Multiple buildings made of steel

Steelox interlocking steel paneled buildings can be placed side by side, making total floor area to be enclosed virtually unlimited both in width and length. Forty-foot buildings are now available in heights up to 20 ft. Columns are placed every 40 ft. in one direction and every 20 or 30 ft., as required, in the other. Additional features are lean-tos and open sidewalls; continuous ridge ventilators; sliding doors. *For literature on Armco steel buildings, circle key number on rip-out postcard.* Armco Drainage & Metal Products, Inc.

137

Does double duty

New 503 strap and wire cutter has two sets of cutting surfaces: those at mouth of tool will handle flat strapping, and those near rear of cutter head are for wire and other round strapping. Tool will cut strap as heavy as ¾ in. x .035 or 12-gage wire. Cutting blades can be resharpened. *For more information circle key number on rip-out postcard.* A. J. Gerrard & Co.



FREE...

Write for sample with cost summary and Bulletins 101 and 161 giving the complete Federal stamping story.

9 holes—2 different diameters—*punched simultaneously using Federal's new multiple hole-punching process!*

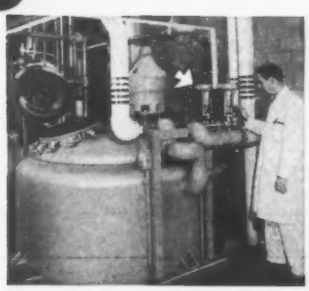
PRECISION die cut stampings in short runs involving hole-punching can now be made at even lower piece prices with Federal Tool's new multiple hole-punching process. Savings in press time and reduction in number of operations performed result in lower stamping costs. Before you buy . . . try Federal. Send your prints for lower cost quotations.

Federal TOOL AND MANUFACTURING CO.
1407 W. MAGNOLIA BLVD., BURBANK, CALIFORNIA
AND 3605 ALABAMA AVE., MINNEAPOLIS 16, MINN.

For more details circle No. 82 on Reader Service Postcard

More and more Prominent Users of POWERS

FLOWRITE
Diaphragm Control Valves



New ARMOUR PHARMACEUTICAL CENTER is using Powers Characterized V-Port Valves for accurate control of steam, water, vacuum and propylene glycol for various processes. Powers **FLOWRITE** premium quality valves are reasonably priced. Their points of superiority are described in Bulletin 344-V. Write for a copy.

(c9)

THE POWERS REGULATOR CO.
Skokie, Ill. • Offices in 60 Cities
See Your Phone Book

Over 60 Years of Automatic Temperature and Humidity Control

For more details circle No. 83 on Reader Service Postcard

138

Safer, faster grinding

New Type "G" abrasive disc is designed for heavy weld removal, slotting, and portable cutoff operations. Both sides and the periphery of disc can be used for cutting. Available in grit 24 in two sizes: 7 in. and 9⅛ in. *For details circle key number on rip-out postcard.* Minnesota Mining and Manufacturing Co.

139

Hard-wearing plastic panels

Masonite Micadyne is a rigid, decorative plastic laminate 5/32 in. thick, manufactured in twelve patterns and colors, for table and counter tops or paneling of furniture and walls. Plastic used in decorative and armor ply sheets is a new synthetic, resin type, thermo-setting product. Panels can be cut with woodworking tools. Now available in two sizes, 48 x 96 in. or 49½ x 97½ in. *For more information on physical characteristics and suggested applications, circle key number on rip-out postcard.* Masonite Corp.

140

Three-in-one control lever

Colson Handler, new gas-powered lift truck, has a single control lever for throttle, power lift, and direction of travel. Hydraulic pump operating off engine delivers oil from reservoir to fluid motor when lever is moved forward (or backward for reverse), and to platform's load lifting cylinder when lever is lifted. Steering is controlled by steering arm with spinner knob. *Circle key number on rip-out postcard for more information.* Colson Corp.

141

Electric lift in complete package

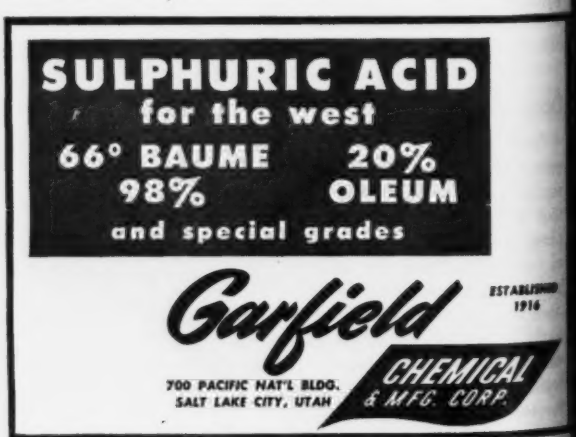
New Rapistan LV electric platform hoist is offered with a platform for use within one floor; with a cab for mounting in a hoistway for between-floors use; or equipped to lift and lower materials between levels of a gravity or power conveyor system. It comes as a complete package for installation by customer. Upper and lower limits of platform travel are adjusted by setting micro swtiches at desired points on carriage frame. Available in choice of lift speeds with either 250 or 500 lb. capacity. *For full details circle key number on rip-out postcard.* The Rapids-Standard Co., Inc.

142

Taps

One-pass patented Acme taps are now available in diameters from ½ through 1½ in., in increments of ⅛ in. Formerly custom made to order, these special taps have a patented fine lead thread which pulls the heavier Acme section through the stock, tapping a precision Acme thread with one tool and in one operation. *For complete list, specifications, and prices, circle key number on rip-out postcard.* Horspool & Romine Mfg. Co., Inc.

For more details circle No. 84 on Reader Service Postcard



For more details circle No. 85 on Reader Service Postcard

d with
nount-
ped to
ity or
ckage
its of
hes at
ice of
ull de-
apids-

ble in
nts of
al tape
eavier
Acme
mplete
n rip-

1954

HELPFUL LITERATURE

143

"Here's How"

... booklet on operation of National welding and cutting outfits describes company's equipment and gives complete data on its utilization. Step-by-step illustrated directions, tip and nozzle selection charts, and safety suggestions are included in this helpful booklet. *National Welding Equipment Co.*

144

Rust prevention

Three new leaflets describe and illustrate rust and mildew prevention offered by Rust-Oleum. Data on use of product under varying conditions are given. *Rust-Oleum Corp.* 115, 165, 170

145

Vari-Speed info

New brochures on Reeves equipment describe fractional horsepower Vari-Speed Motodrive, Vari-Speed motor pulley, Vari-Spin drive, and Auto-Pneumatic control. Each brochure contains full info and technical data. *Reeves Pulley Co.* M-534, V-545, G-544, M-542

146

Multipress catalog

Cost cutting and boosted production are claimed by Denison for users of Multipress in their new 4-page catalog. Photographs and descriptions of press in operation are shown. Multipress performs blanking and forming, riveting, coining, drawing, crimping and swaging operations. *Denison Engineering Co.* 153

147

Low-cost load handling

... is claimed by Tug-Bar leaflet. Illustrated is 110-pound, 2-ton capacity Tug-Bar load mover and its various applications. *Western Gear Works*

148

Personnel administration

"Sources in Personnel" is first of series of bulletins by Industrial Phychology, Inc., on source materials in the field of personnel administration. This 16-page bulletin lists names and addresses of 375 major sources. *Industrial Psychology*

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
First Class Permit No. 3755, Sec. 34.9, P. L. & R., San Francisco, Calif.

WESTERN INDUSTRY

609 Mission Street

San Francisco 5, Calif.

USE A POSTCARD for THESE THREE FREE SERVICES

1. For your free copies of **HELPFUL LITERATURE** reviewed in this issue, circle appropriate key numbers.

2. For more information on **NEW EQUIPMENT AND MATERIALS** reviewed on preceding pages, circle key numbers.

3. For complete information on **PRODUCTS ADVERTISED** in this issue, circle key number from line below advertisement.

Western Industry

READER SERVICE CARD — NOVEMBER 1954

Circle key numbers for information and literature you want

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124
125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149
150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174
175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224
225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249
250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274
275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299
300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324
325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349

NAME .....

TITLE .....

COMPANY .....

ADDRESS .....

Western Industry

READER SERVICE CARD — NOVEMBER 1954

Circle key numbers for information and literature you want

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124
125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149
150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174
175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224
225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249
250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274
275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299
300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324
325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349

NAME .....

TITLE .....

COMPANY .....

ADDRESS .....

New products and manufacturers' booklets reviewed in **Western Industry** are screened and selected for your needs. The advertisers in **Western Industry** call your attention to important services and developments available to Western firms in this period of dynamic growth. Take this opportunity for aid in keeping your business in step with this growth.

YOUR REQUEST on a POSTCARD

will result in our prompt and thoughtful action.

There is no obligation to you for this service.

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
First Class Permit No. 3755, Sec. 34.9, P. L. & R., San Francisco, Calif.

WESTERN INDUSTRY

609 Mission Street

San Francisco 5, Calif.

149

Industrial gloves

Leaflet gives information on Sure-seal synthetic industrial gloves. Said to offer highest resistance to rubber solvent chemicals, acids, snagging, abrasion, and swelling, gloves come in several different styles and finishes. *Surety Rubber Co.*

150

Micro Switch news

Two periodicals published by Micro Switch, "Uses Unlimited," for design engineers, and "Micro Tips," for plant engineers and maintenance men, give news on the company's switches and their applications. Generously illustrated with photographs and diagrams. *Minneapolis-Honeywell Regulator Co.*

151

Rollover hopper

New NesTier unit delivers small parts directly from shipping container to assembly or production workers, according to Doepke bulletin. Bulletin explains operation of rollover hopper and shows flow regulator gate and hopper tray designed for easy withdrawal of contents. *Chas. Wm. Doepke Mfg. Co.* ROH-201

152

Appraisal service

. . . is outlined by General Appraisal Co. in its new leaflet. Leaflet lists information supplied in an appraisal and suggests some of its uses, among them insurance, financing, accounting, and taxation. *General Appraisal Co.*

153

How to control dust

. . . in various parts of ceramic industry is discussed in new bulletin by American Wheelabrator. "How to Save Money in 1954" will interest manufacturers of enamel ware, pottery silica brick, refractories, whiteware, glass, insulators, and various ceramic structural products. Giving case histories, bulletin tells how dust conditions in ceramic industries are prevented by using local exhaust ventilation with Dustube dust collectors. Saving of materials expense and increased plant efficiency are claimed. *American Wheelabrator & Equipment Corp.* 482

HELPFUL LITERATURE

FOR THE PLANT OPERATOR WHO WANTS TO KEEP INFORMED

154

Welding problems

New 8-page Eutectic manual explains variables which the maintenance welder has to face and discusses the causes of stress raisers, starter cracks, and hard spots. Illustrations show how weld failures can be avoided if due consideration is given to joint design, and if correct welding techniques are used. *Eutectic Welding Alloys Corp.*

155

LP-gas brochure

LP-gas conversions for industrial trucks is subject of new, informative brochure. Simplicity of converting fork-lift and other in-plant vehicles to LP-gas operation is explained in detail to meet the demand for complete info on the use of this fuel for material handling equipment. *American Liquid Gas Corp.* FL-100

156

Multi-unit load handling

Moving and storing of many types of multi-unit loads by Yale pallet hand lift trucks is pictured and described in 12-page brochure. Illustrated with application photos showing hand trucks handling a variety of materials, brochure features a section describing different pallet types and designs and gives their specifications. Cut-away photos show operation of both hydraulic and mechanical lifting mechanisms. *Yale & Towne Mfg. Co.*

157

Orinoco iron

Exceptionally interesting booklet on the development of Venezuelan iron ore deposits is offered by Link-Belt. Many illustrations, including maps and diagrams, help tell the story of the engineering and equipment that made possible exploitation of Cerro Bolivar ore fields. *Link-Belt Co.*

158

Index of Trane products

Revised product bulletin on Trane heating, air conditioning, ventilating, and heat transfer equipment is now available. All new products, as well as existing ones, are covered. Shown are new large size CenTraVacs, cold generators, duplex compressors, UniTrane models, Trane accessible hermetic compressors for use in self-contained air conditioners, new Climate Changers, new Delta-Flo fin coils, baseboard convectors, and many other products. *Trane Co.* PB-290

159

Neoprene Notebook

This issue of company periodical, 8 pages long, tells how rubber industry runs its tests and what test results mean to engineers and designers of rubber parts. Seventh of "Language of Rubber" series gives applications and advantages of neoprene in tank car coatings, hog drive belts, shoe soles, and pumps. *E. I. du Pont de Nemours & Co.* 60

160

Blowers and exhausters

Revised 12-page bulletin on Hoffman Multistage centrifugal blowers and exhausters describes equipment built for applications requiring air pressure from 1 to 9 psi., or vacuum from 2 to 12 inches of mercury, delivering air at uniform pressure. Bulletin describes designs, types, and advantages of these blowers and exhausters and gives several charts showing the capacity ranges of both. *U. S. Hoffman Machinery Corp.* M-103

161

Aluminum roofing accessories

New Alcoa copings and gravel stops are described and illustrated in new brochure. Included are specifications and data on an extruded gravel stop, combining cant strip and fascia band; a gravel stop which forms an integral stop; and two new copings for 12 and 8 in. parapet walls. *Aluminum Co. of America* 12-L-2

162

Valve selection

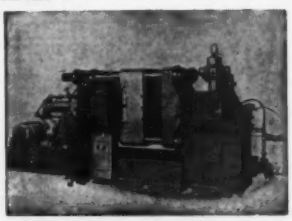
New 20-page two-color pamphlet, "Choosing the Right Valve," has been issued by Crane to serve as a handy refresher in the application of basic valve designs for specifiers and buyers of piping equipment. Valve type specifications, design features, and cut-away views showing component parts are featured in this well-illustrated pamphlet. *Crane Co.*

BETTER QUALITY EQUIPMENT FOR THE METALWORKING INDUSTRIES

KUX DIE CASTING MACHINES

Kux produces the most complete line of air or hydraulically operated machines for lead, tin, zinc, aluminum, brass or magnesium die casting with a size and model for every die casting need. Simple and safe to operate these machines are low in original and upkeep costs and are used in hundreds of plants in round the clock production.

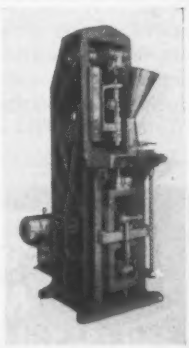
All machines are equipped with extra large oil reservoirs, oversize oil coolers and filters. They have a speed shot up to 1200 feet per minute and a range in locking pressures up to 800 tons.



"CALL FERNHOLTZ FIRST"
For Complete Information

KUX TABLET PRESSES

Kux Presses have become the accepted standard machines for automatically forming, at high production speeds, tablets and parts from dry, powdered or granulated materials. They are available in the Spindle, Toggle, Multiple Motion, and Rotary types with a range in capacity to 1000 tons and 8" diameter tablets. Rigidity of design and ruggedness of construction enable these machines to meet the most severe demands for service. In addition to their standard line of tablet presses Kux also manufactures special presses for automatic sizing or coining; high production and cooked candy presses, and high bulk factor performance presses.



FERNHOLTZ MACHINERY CO. 8468-W MELROSE PLACE LOS ANGELES 46, CALIF. • WEbster 8-5145

For more details circle No. 86 on Reader Service Postcard

HELPFUL LITERATURE

163

Valve bulletin

New 16-page bulletin covers Ledeen's complete line of standard four-way hand, foot, power, and solenoid operated valves and new line of pilot valves. Dimensions and weights, application diagrams, circuit diagrams, parts list, and accessories are also included in bulletin. *Ledeen Mfg. Co.* 1010

164

Gas turbines for pipelines

This 12-page, two-color booklet contains detailed information on operation and application of G-E combustion gas turbines for gas pipeline pumping. Numerous illustrations and drawings help explain turbine, and booklet gives data on internal construction and on installations. *General Electric* GEA-5962

165

Hot extrusions

. . . in stainless, tool steels, high temperature alloys, and other steels are shown in attractive new Allegheny Ludlum leaflet. Leaflet describes advantages in purchasing extruded shapes that can be closer to finish sizes than regular hot rolled materials, reduced scrap losses, advantages in small quantity production, and physical characteristics of extruded shapes. *Allegheny Ludlum Steel Corp.*

166

Microcarb atmosphere control

"Microcarb Atmosphere Control for Control of Carbon Potential in Homocarb Furnaces," 12-page catalog graphically explains principle and operation of this method for continuous, automatic measurement and control of active carbon inside furnace retort during heat treating cycles. *Leeds & Northrup Co.* TD4-620(2)

167

Safety and rescue equipment

. . . needs are graphically outlined in Mine Safety Appliance booklet, "Disaster." Assuming the existence of groups or teams within a plant whose job it is to effect rescue and recovery operations in case of an emergency, booklet shows items of equipment needed by these teams. Sections cover needs of a rescue team, an engineering team, and a medical team, and give a table-of-equipment check-chart for quick reference. *Mine Safety Appliances Co.* 5000-4

168

Space heaters

. . . for commercial and industrial establishments are described in 8-page bulletin on Dravo's line of Paraflo warm-air, oil or gas fired space heaters. Booklet illustrates design and construction features, shows application and installation, and gives engineering data on these completely packaged, 200,000 or 250,000 Btu. per hour capacity heaters. *Dravo Corp.* 552

169

Hydraulic pumps

. . . by Dudco are featured in 4-page leaflet, illustrated with a cut-away view of the PVM-600 model and performance charts and drawings of the PV-600 series. These pumps generate continuous duty pressures up to 5,000 psi. and deliver 3.0 gpm. at 1,200 rpm., according to leaflet. *Dudco Division, New York Air Brake Co.* DP-350

170

Adjustable-speed drive

. . . is described in 4-page leaflet on Reliance V*S Drive with Xatron rectifier. Available in 30, 40, and 50 hp. ratings, the Xatron V*S Drive claims powerful starting, quiet operation, and low installation cost. *Reliance Electric and Engineering Co.* D-2351

171

Hydraulic control valves

Here are 10 data sheets covering Parker hydraulic directional valves for mobile equipment applications, including 1-, 2-, 3-, and 4-spool models of from 8 to 35 gpm. capacity. Scale drawings, specifications, and selection data are clearly given. *Parker Appliance Co.* 1551A

172

Pictorial ideas in wood

New 24-page book contains idea pictures of house interiors and exteriors using Western pine softwoods. Numerous hints and design suggestions on use of wood in decoration are illustrated in "Friendly Home Ideas in Western Pine." *Western Pine Association.*

173

"Pressure Recorders"

New line of pressure instruments designed for direct measurement, remote transmission, and automatic control is presented in Foxboro's 24-page bulletin. Telling how this equipment is used in instrumenting the more specialized processes of industry, bulletin contains application chart showing wide choice of element materials available, and describes case and linkage features, lists charts for standard process ranges, and covers accessories. Also included are sections on electronic pressure instruments, cabinets and panels, controllers, and transmitters. *Foxboro Co.* 6-10

174

Arc welding news

A 24-page booklet of interesting photographs and articles on welding from all over North America is offered to anyone interested in arc welding. Many articles in this periodical feature time and money saving applications. A section on Hobart equipment is included. *Hobart Brothers Co.*

IRA G. PERIN CO.
Material Handling Equipment
SAN FRANCISCO 5
575 Howard Street
Phone GArfield 1-1827
LOCAL STOCK & PARTS
SERVICE • • SURVEYS
LOS ANGELES 22
5422 E. Washington Blvd.
Phone RAymond 3-5233

For more details circle No. 87 on Reader Service Postcard

175

Wiring system

New low-voltage wiring system for central and remote control of multiple circuits is described in a 6-page bulletin by Bryant Electric. System offers the convenience of controlling lighting and appliances from any number of switching points and control of up to nine circuits from a single location. Outdoor and indoor installations are described and a simplified wiring diagram presented to explain operation of 24-v. system which controls 125-v. power circuit. *Bryant Electric Co.*

176

Electrical insulation

Three sample folders introduce new series of composite asbestos electrical insulations recently added to Johns-Manville's Quinterra and Quinorgo line. Use of a reinforcing material is claimed to make these insulations suitable for motor rewinding and many other dynamic applications in which purified asbestos sheets were not previously used. Folders contain samples for testing and experimentation, plus descriptive info covering application, packaging, physical and electrical properties, and pyrolysis resistance. *Johns-Manville* EL-54A, EL-49A, and EL-55A

177

"Elinco Commutator Motors"

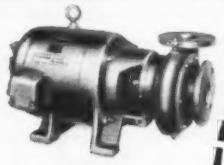
Indexed and arranged by subject, 22-page brochure offers a quick reference to electrical and physical characteristics of full line of Elinco commutator motors and governor units. Brochure includes sections on field, shunt, and universal motors and permanent magnet and separately excited types. Performance curves, dimensional drawings, and specifications are also given. *Electric Indicator Co.* EI-2A

178

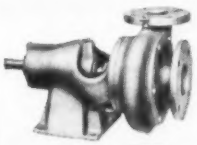
Rolled steel products

New Bethlehem Pacific Coast Steel catalog lists all the steel sections that can be rolled at its West Coast rolling mills. Size, weight per foot, and design properties of structural and bar size shapes are shown, and a commodity listing of wire, a tabulation of bolt and nut products, and a list of special analysis steel which company manufactures are included. *Bethlehem Pacific Coast Steel Corp.* 305-B

CARVER has the PUMPS... TO FIT YOUR NEEDS!



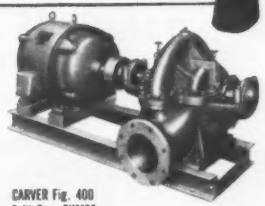
CARVER L & H PUMPS 30 to 900 G.P.M.



CARVER Type FL PUMPS 20 to 900 G.P.M.

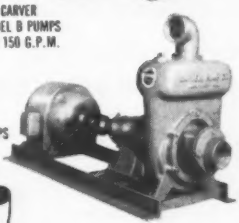
Whatever your requirements, there is a pump in CARVER'S Complete Line that will give you outstanding performance over a wide range of capacities and heads. CARVER . . . your best buy for better pumping.

CARVER PUMP CO.
1472 Hershey Ave.
Muscatine, Iowa



CARVER Fig. 400 Split-Case PUMPS 200 to 2000 G.P.M.

CARVER MODEL B PUMPS 6 to 150 G.P.M.



CARVER Model KF PUMPS Self-Priming 20 to 4000 G.P.M.

CARVER

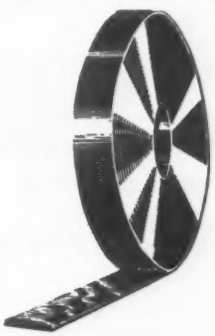
Ask for bulletins

CARVER *the quality name in pumps*

Western Region Warehouse
1530 W. 12th St.
Long Beach 13, Calif.

For more details circle No. 88 on Reader Service Postcard

Beryllium Copper STRIP AND WIRE
for electronics and aircraft industries



A reliable copper base alloy that can be easily heat treated. In hardened condition, it has very long fatigue life and tensile strengths far higher than any other electrically conductive material. A perfect metal for SPRINGS, DIAPHRAGMS, and STAMPINGS of all kinds.

FOR YOUR OTHER NEEDS—PRECISION ROLLED THIN GAUGE STRIP IN ALMOST ANY METAL—SPRING STEEL STRIP — MUSIC WIRE — STAINLESS WIRE—MONEL WIRE—call us for prompt deliveries.

KRUSEN WIRE & STEEL CO.
4312 Pacific Way • Los Angeles 23 • AN. 1-2147

For more details circle No. 89 on Reader Service Postcard

"MECHANIZE"
YOUR MATERIAL HANDLING
with these modern time and cost-savers

Faster Piling with the HANDIPILER

• Saves time, money, and manpower. Ideal for storage areas—loading, unloading, piling, stacking. Boom is designed to pile up to 12 ft.—extends into corners, box cars, trucks, trailers.

Handles bags, bundles, packages up to 135 lbs.—reversible apron—conveys up or down. Available in 14 and 24 inch belt widths. Write for Bulletin 63 D. Address WI-94.

Straight or Curved All-purpose ROLLER CONVEYOR

• Available in a complete line of sizes and capacities designed to allow the selection of the best roller conveyor for the job—from a 1 inch diameter roller, capacity 35 lbs. Any commodity with one smooth riding surface can be carried—boxes, cases, cartons, lumber, milk cans, brick, tile, units and parts. Straight sections and 90° and 45° curves. Write for Bulletin 63 D; address WI-94.

STANDARD CONVEYOR COMPANY
General Offices: North St. Paul 9, Minn.
Sales and Service in Principal Cities

SEATTLE 4: Russell G. Daley, 502 First Ave. S.
PORTLAND: 1115 N.W. Glisan St.
SAN FRANCISCO: 840 Harrison St.
LOS ANGELES: 115 E. 23rd St.

Send for Bulletin 63-D, describing Standard gravity and power conveyors and conveyor units — address Dept. WI-114

Standard
GRAVITY & POWER
CONVEYORS

For more details circle No. 90

HELPFUL LITERATURE

179

"Brake Shoe Products"

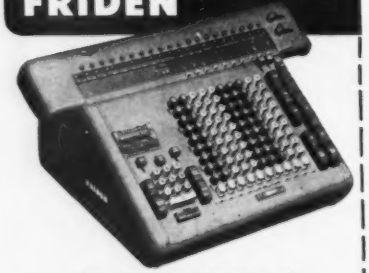
First complete catalog of Brake Shoe products is published by American Brake Shoe Co. Placing emphasis on industrial products, this 48-page, two-color book illustrates parts produced by company and details physical properties. Catalog contains sections on ferrous and non-ferrous castings, bearing materials, sintered metals, steel forgings, welding products, air compressors, industrial pumps, dredge pumps, and railroad products. *American Brake Shoe Co.*

180

Engineering folio

. . . describes air data components and systems for aircraft and guided missiles. This 26-page booklet covers part of AiResearch's full line of transducers, computers, and completely integrated air data systems for measuring all aerodynamic conditions affecting flight. Photos, drawings, graphs, and formulas describe operating principles of current equipment, typical specifications of each component, and performance characteristics. *AiResearch Mfg. Co.*

FRIDEN



The Thinking Machine of American Business

SELECTS
GENERAL APPRAISAL

Accuracy is the keynote of Friden Calculating Machine Co., Inc., that's why the factual information of a General Appraisal was a major factor in the selection of General Appraisal for a plant valuation report. Friden Calculating Machine Co., Inc., is an important name on the ever-expanding list of General Appraisal's satisfied clients. It will pay you also to investigate the advantages of a General Appraisal.

GENERAL APPRAISAL CO.

SEATTLE SEneca 6655
PORTLAND GArfield 0095
SAN FRANCISCO Sutter 1-2056
LOS ANGELES TRinity 9631

For more details circle No. 91

181

"Hydro-Line Pumps"

New Peerless bulletin describes and illustrates two types of vertical, encased, close-coupled pumps for handling of hydrocarbons, hot or cold water, mild acids, and basic and salt solutions. Construction features of both process-type and transfer-type vertical pumps are given in detailed drawings. *Peerless Pump Division, Food Machinery and Chemical Corp.* B-1700

182

Blast cleaning

. . . on the production line with Pangborn's Continuous-Flo Rotoblast reduces cleaning costs, according to company's new 16-page bulletin. Text, sketches, and photographs explain how the system works. Schematic drawings show applications of five sizes of Rotoblast barrels. Advantages claimed are increase in tonnage cleaned per hour and elimination of manual handling. *Pangborn Corp.* 226

183

Steel shoring equipment

. . . designed to handle any concrete shoring job is described in new bulletin by Patent Scaffolding. "Modern Shoring for Concrete Construction" features three types of steel shoring—Trouble Saver sectional shoring, Tube-Lox shoring, and Burton's shores—and gives data on cost savings, safe loads, and typical installations. *Patent Scaffolding Co.*

184

Electric plants in mobile service

Pocket-size 20-page booklet describes use of electric generating plants in mobile installations. Case histories of Onan's equipment in a bakery truck, a traveling auditorium, and standby plants for telephone exchanges are given. *D. W. Onan & Sons, Inc.*

185

MonoRail case studies

New series of eight case studies by American MonoRail reports on engineered application of monorail equipment. Series includes studies on solution of materials handling problems in both large and small industries with use of monorail equipment. *American MonoRail Co.* F-2

186

Cooling tower bulletin

Handsome 36-page brochure gives detailed explanation of cooling tower construction and applications. "Cooling Water for Industry" provides description of Fluor induced-draft cooling tower construction, with photos, sketches, and cutaway and exploded drawings showing detail of structural and mechanical equipment, and will be of particular interest to those with heat dissipation problems. *Fluor Corp., Ltd.*

187

Sylvania cellophane history

Milestones of Sylvania's history and contributions to packaging industry are marked in 25th anniversary booklet. "25 Sparkling Years" includes sections on development of heat-sealing moisture-proof cellophane and flame retardant cellophane, as well as on people who make Sylvania cellophane, customers who use it, the plant in Fredericksburg, Va., and division's research facilities. *American Viscose Corp.*

188

New servo system

Technical reference booklet pictures and describes a recently-developed servomechanism system, containing a synchromechanism, control transformer (balancing synchro), servo amplifier, and servo motor. Besides describing construction features and listing the operating characteristics of system, this 4-page reference includes photos and engineering drawings of key parts and a diagrammatic layout showing how parts are hooked up. *Richardson Scale Co.* 54B

189

Airtherm convector line

Newly released booklet contains detailed descriptions, photos, specifications, and construction and application info on Airtherm convectors. Floor, wall, front outlet wall, recessed and partially recessed cabinets, and sloping top models are described. Tables and charts show capacities of various models. *Airtherm Manufacturing Co.* 703

190

Data on cast stainless alloys

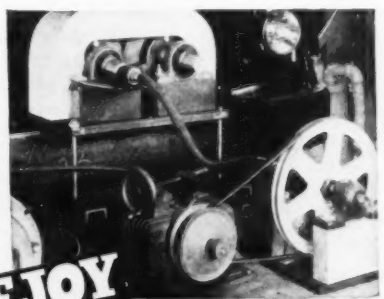
. . . is compiled in new set of data sheets covering properties of all more popular grades of alloys used for corrosion resistant (stainless steel) castings. Each of 13 data sheets lists chemical compositions, physical and mechanical properties, and design considerations. Metallurgical structure and characteristic of alloys are described, preferred heat treatments recommended, and general fields of application listed. *Alloy Casting Institute.*

191

Centrifugal thrower units

New 8-page brochure covers Stephens-Adamson's line of fixed and portable Swiveloaders for loading or storing bulk materials. New Hi-Type Swiveloader, designed for loading over grain doors of box cars at capacities up to 150 tons per hour, is featured along with standard Swiveloader and a portable Swivelpiler. *Stephens-Adamson Mfg. Co.* 854

the right speed always to FIT THE JOB!



LOVEJOY SELECT-O-SPEED Variable Speed Transmissions

Here a Select-O-Speed Transmission is used to drive and control the speed of a pulley and flexible shaft connected to a vibrator that checks vibration of vehicular components at changing speeds.

Make accurate speed adjustments on all types of machinery, new or old, for: testing — operator ability — variously sized parts or stock — material differences — any other operational variables . . . without loss of time or labor.

Easily installed, Lovejoy Select-O-Speed Transmissions provide better, more efficient production control to help you improve the quality of your products. Speed ratios to 10 to 1. Sizes to 5 hp. Hand lever or wheel control. Operate with standard V-belt drives. Fully enclosed. Send today for illustrated catalog giving complete information.

W. OSTRING, 1149 East Pico Blvd., Los Angeles, Calif.
EDWARD L. PARSONS, 600 Sixteenth St., Oakland 12, Calif.
CHAIN GEAR, INC., 822 First Ave., South Seattle, Washington

LOVEJOY FLEXIBLE COUPLING CO.

4892 W. Lake Street Chicago 44, Illinois
Also Mfrs. of Flexible Couplings, Universal Joints and Variable Speed Pulleys

For more details circle No. 92 on Reader Service Postcard

TAP® MAGIC

A Compound for
Tapping • Threading • Drilling • Reaming

NOT A CUTTING OIL!

SPEEDS Tapping and Threading
CUTS Clean Threads STOPS Tap Breakage
FREES Stuck Taps Instantly

EFFECTIVE ON ALL METALS
Alloys . . . Castings . . . Aluminum . . . Brass
Magnesium . . . Bronze . . . Titanium . . . Stellite
Steel (Mild, Normalized
Stainless, Tempered)

A standard 4 oz. can Postpaid $1.00 and the name of your local supplier

DISTRIBUTORS AND JOBBERS:
This is Fast Moving . . . Repetitive Merchandise

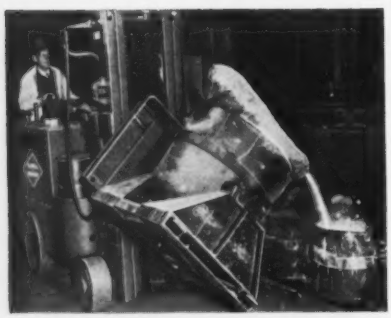
SMITH TOOL & ENGINEERING COMPANY
A Division of Smith-Cage Yucaipa, Calif.

For more details circle No. 93 on Reader Service Postcard

3 Basic Advantages of ELWELL-PARKER Trucks

1 LOW MAINTENANCE—Packaged unit assemblies insure accessibility for fast, easy *preventative* servicing.

2 DEPENDABILITY—15 to 20 years' service is common. Rugged alloy steels, forgings and reinforcement of critical parts prevent excessive wear or breakdowns.



3 SPECIAL ENGINEERING—Elwell-Parker can solve unusual load or operating problems; like pouring molten metal, as shown.

Send for New Catalog

West Coast Representative

IRA G. PERIN CO.

San Francisco • Los Angeles

For more details circle No. 94

HELPFUL LITERATURE

192

Handling fruit

Fast handling system in fruit product freezing and canning plant, to bring fruit to production lines, to store canned fruit, and to handle loading and shipping operations, is described in Towmotor's "Job Study No. 119." Using four Towmotor fork lift trucks, The Sunshine Packing Co. of North East, Pa., is said to have reduced handling costs 87½% and increased production 230%. *Towmotor Corp.*

193

New transmission belt

. . . is described in new brochure on Poly-V drive, Raybestos-Manhattan's new concept of belt power transmission. Design characteristics of this single endless belt with molded lengthwise ribs are explained in line drawings that show advantages claimed for drive. Eight-page folder also makes offer of engineering service and data to help solve existing drive problems. *Raybestos-Manhattan, Inc.* 6638

SEAL YOUR TOOL HANDLE REPAIR TROUBLES with **MORE SAFETY-HUGE ECONOMY** by using Seal Brands

Safety Seal, Gold Seal, Blue Seal, Red Seal, Green Seal, White Seal. Gives long and hard service. Made only with second growth hickory. Greater strength — less breakage.

Eye of each handle in most Seal Brands is slit for wedge, for which metal and wood wedges are included — at no extra cost.

Sold Through Recognized Industrial Supply Distributors and Hardware Jobbers

LaPierre-Sawyer Handle Co.

Jackson, Missouri

For more details circle No. 95

194

Lubricating oil filters

"No Short Cuts to Safe Filtering," Caterpillar's new 8-page booklet, discusses risks of short cuts in lubricating oil filter systems and the importance of using a filter made for your engine. Step-by-step discussion of what filter must accomplish and a description of how a full-flow filtering system serves engine are also included in this illustrated booklet. *Caterpillar Tractor Co.* D455

195

Gas and air cleaner

Dorfan Impingo filter for cleaning hot, wet, and corrosive gases and air is detailed in new 8-page brochure. Filter removes dust, dirt, and impurities by passing gases horizontally through two or more cells containing moving granules. Included in brochure are installation photos, engineering drawings of filter components, and complete systems, and descriptive data. *Mechanical Industries, Inc.* 4

196

Recording oscillograph

Attractive 12-page brochure on Consolidated Engineering's multi-channel recording oscillograph lists and diagrams features of this precision equipment. Specification charts, technical data, and description of associated equipment are included. Booklet also outlines repair services offered by company for its products. *Consolidated Engineering Corp.* CEC-1521A

197

Lead handbook

Hot off the press is "Lead Handbook for the Chemical Process Industries," new 48-page handbook which was over three years in the making. From "Acid Effects" to "X-Ray Protection," book contains a mass of helpful info on lead and lead products. *American Smelting and Refining Co.*

198

Belt conveyor carriers

Bulletin gives dimensions and installation data on Stephens-Adamson SP-745 belt conveyor carriers. Design features mentioned are: spun end interchangeable rollers, die-cast noncontact labyrinth seal, and jig-welded steel frame. *Stephens-Adamson Mfg. Co.* 554

WESTERNERS AT WORK

ARIZONA

Arizona Public Service Co.

New appointments of this Phoenix firm include: *Claire Titus*, former assistant to executive vice president, now general manager and assistant to president; *George H. Groh*, former vice president in charge of operations, now vice president and assistant to executive vice president in charge of planning and production; *Douglas B. McGregor*, former vice president in charge of sales and personnel, now vice president in charge of personnel and other duties; *Don Willis*, former general sales manager, now vice president in charge of sales; *Walter T. Lucking*, former superintendent of power and supply, now vice president in charge of operations; and *T. A. Phillips*, former chief engineer, now vice president in charge of engineering.

Miami Copper Co. and Copper Cities Mining Co.

Ben R. Coil, assistant general manager of these two Miami companies, is appointed manager.

CALIFORNIA

G. M. Giannini & Co., Inc.

J. Murray Wilson becomes vice president and treasurer of this Pasadena precision instrument manufacturer. *Edward H. Hughes* assumes position of assistant secretary.

Russell, Burdsall & Ward Bolt and Nut Co.

Price Berrien, plant manager for this Los Angeles manufacturer since 1948, leaves firm in order to join National Screw & Manufacturing Co. as general plant manager at its Cleveland headquarters.

Price Berrien
National Screw & Manufacturing Co.

V. L. Peickii
National Motor Bearing Co.

National Motor Bearing Co.

V. L. Peickii becomes director of product research engineering and development for this Redwood City firm. Mr. Peickii was formerly factory manager for Micromatic Hone Co., Los Angeles.

Pacific Division, Burnell and Co., Inc.

Frank W. Edmonds is named president of this new organization, a subsidiary of Yonkers, N. Y., manufacturer of radio equipment, with new plant in South Pasadena.

Laura Scudder's Blue Bird Potato Chip, Inc.

Paul M. Porter advances from position of sales and merchandising manager to manager of all company operation, with headquarters in Oakland.

Rome Cable Corp.

Glenn Koger is appointed manager of company's Torrance plant. Former acting manager of plant, *Gilbert Woodill*, is now serving as assistant treasurer.

Southern California Edison Co.

H. W. Tice becomes senior vice president, and *James F. Davenport* vice president and general manager of this utility company.

Santa Fe Railway

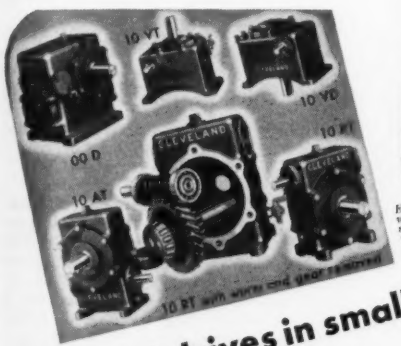
D. F. Todd, company supervisor of wage agreements at Los Angeles, is appointed assistant to general manager, Santa Fe Coast Lines, succeeding the late *A. B. Enderle*.

S&W Fine Foods, Inc.

Samuel A. Ranzoni, a director of this San Francisco company since 1940, is elected a vice president. *Frank A. Beeton*, who has been controller since 1947, is elected secretary.

Anaconda Wire & Cable Co.

William O. Riley is promoted to post of superintendent of newly expanded mill at Orange. He moves from company's mill at Anderson, Ind.



Every small worm gear unit is built to precision standards—to outstanding in quality and performance as larger size Cleveland reducers.

Cleveland drives in smaller sizes

When you want a quiet, powerful, dependable drive for a small machine, choose a Cleveland Worm Gear Speed Reducer.

1. It is compact and inherently quiet, transmitting power with smooth, uninterrupted flow.
2. Its right-angled design saves valuable space.
3. It has a minimum of moving parts.
4. Shock load resistance and other factors of safety are high.
5. Rate of wear of case hardened steel worm on nickel-bronze gear is low, insuring long life.

Write for Bulletin 114F on smaller size Clevelands—available now. The Cleveland Worm and Gear Co., 3290 E. 80th St., Cleveland 4, Ohio.

CLEVELAND
Worm Gear
Speed Reducers

For more details circle No. 96 on Reader Service Postcard

NOW! BUILD YOUR OWN Pallet Racks, Rails and Shelving... with

Nu-Rail SLIP-ON FITTINGS

AN ENTIRELY NEW METHOD OF FITTING PIPE

NO WELDING!

USE ALL PARTS OVER AND OVER AGAIN!

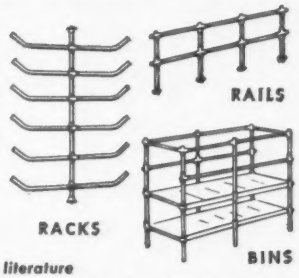
USE ANY I.P.S. PIPE OR TUBING . . .
NO PIPE CUTTING . . . NO WELDING

Build them when and where you need them

SAVE MONEY, too!

Just a few examples of Nu-Rail versatility! If it's made of pipe . . . you can make it BETTER, FASTER AND FOR LESS . . . with Nu-Rail!

Distributed coast to coast.



Write for literature

THE HOLLAENDER MFG. CO.
3843 Spring Grove Ave., CINCINNATI 23, OHIO

Pacific Metals Co. Ltd., 3100—19th St., San Francisco, Calif.
Pacific Metals Co. Ltd., 261 West 5th South, Salt Lake City, Utah.
McKinley Equipment Corp., 1003 Santa Fe Ave., Los Angeles, Calif.
Pacific Metal Co., 303 N. W. Park Ave., Portland, Ore.
Pacific Metal Co., 4150 First Ave. South, Seattle, Wash.
THE HOLLAENDER MFG. CO., CINCINNATI 23, OHIO

For more details circle No. 97 on Reader Service Postcard

WESTERNERS AT WORK

Detectron Corp.
This North Hollywood manufacturer names *E. C. Titcomb* to head newly organized division for manufacture of electronic frequency counters.

San Francisco Chamber of Commerce
John B. Watson, president of Goodyear Rubber Co., is elected to serve remaining term of *Jesse W. Tapp* as chamber president. Mr. Tapp has moved to Los Angeles offices of Bank of America. New vice president, succeeding Mr. Watson, is *James E. Holbrook*, vice president of Pabco Products, Inc.

California Aeronautics Commission
First major change in personnel in this organization places *J. B. Douglass*, assistant to the director, in charge of the Southern California office in Burbank. *Arthur R. Kendall* is assigned to the Sacramento office as field representative.

American Forest Products Industries
Paul Nelson of Portland is named district manager of organization's California, New Mexico, and Arizona office in San Francisco.

Convair
A. W. Morgan joins this division of General Dynamics Corp. as assistant to manager, *B. F. Coggan*. He was formerly executive vice president and general manager of Packmayr Gun Works, Inc., Los Angeles. *George M. Robertson* is appointed chief engineer of firm's Pomona plant. *C. D. Perrine* resigns as assistant division manager-engineering to become director of engineering for Pacific Division of Bendix Aviation Corp.

Sturgess, Inc.
La Verne E. Morgan assumes post of chief engineer of this aircraft equipment company at Glendale.

California Grape Products Corp.
E. M. Brown is named technical director of this organization. Mr. Brown will have headquarters at the company's winery at Delano.

Southern Pacific Co. and Pacific Electric Railway
Oscar A. Smith, assistant to the president of Southern Pacific Co. and president of Pacific Electric Railway, Los Angeles, retires. Succeeding M. Smith in both capacities is *George B. Hanson*, southern district passenger traffic manager since 1946.

San Bernardino County Board of Trade
Arthur B. Groos is named industrial director of San Bernardino County, with offices in San Bernardino.

Western Salt Co.
David M. Miller is elected vice president and general manager of this San Diego firm, succeeding *F. A. Riehle, Sr.*

Continental Can Co.
This firm appoints *John L. Rowe* manager of its Los Angeles plant No. 11.

American Can Co.
A. T. Augensen is named manager of this San Francisco company's operations in Hawaiian Islands and will later assume post of operating vice president of proposed subsidiary, American Can Co. of Hawaii. *Lloya E. Davis* succeeds Mr. Augensen as manager of manufacture for Pacific division, in San Francisco. *T. A. Klabau*, former manager in Hawaii, transfers to San Francisco.

Pickering Lumber Corp.
J. C. Rassenfoss retires as president and general manager of this firm, to be succeeded by *F. F. Momyer*.

Pacific Gas & Electric Co.
Jack K. Horton, president of Coast Counties Gas & Electric Co., control of which was recently acquired by PG&E, is appointed vice president of PG&E.

Royal Jet, Inc.
This Alhambra firm appoints *Clem K. Cole*, chief manufacturing engineer. *Birch W. Wilson* is named chief engineer in charge of experimental and development work.

Robertshaw-Fulton Controls Co.
This firm's Grayson Controls division in Los Angeles elects *Wilbur F. Jackson* vice president and *Alton W. Beck* assistant vice president.

Hunt Foods, Inc.
Appointment of *Maurice Feuerlicht* as director of human relations is announced by this Fullerton firm. Mr. Feuerlicht comes to Hunt from Mikron Instruments, Inc., Pasadena.

Aero-Coupling Corp.
This Burbank subsidiary of Aeroquip Corp. appoints *Forrest F. Hinkley* as its general manager, responsible for all sales and manufacturing functions.

F. F. Hinkley
Aero-Coupling Corp.

W. A. Cotton
Masonite Corp.

Masonite Corp.
William A. Cotton moves from post of production manager to that of general manager of this firm's plant in Ukiah. He succeeds *E. T. F. Wohlenberg*, now professor of industrial forestry at Yale University.

C. M. Gifford & Sons
New officers of this San Diego olive cannery are: *O. D. Gifford*, president; *O. M. Ray*, vice president; and *Robert Smedley*, secretary-treasurer.

Thermador Electrical Manufacturing Co.
William K. Body is appointed assistant chief engineer in charge of refrigeration and air conditioning by this Los Angeles firm.

Lear, Inc .
Harry Sosnoski, formerly with U.S. Navy, joins this Santa Monica firm as senior Washington representative in charge of company's Washington office and its staff. *Donald W. Cook* fills newly created post of California industrial relations manager.

E. H. Edwards Co.
New officers of this San Francisco firm are *Kermit Williams*, former executive vice president and secretary, as executive vice president and treasurer, replacing *Norman McEachen*, retired; and *Cynthia Williams*, former assistant secretary, as secretary. *Larry Rosa* is appointed assistant treasurer.

California Redwood Assoc.
Gregory M. J. Lambert joins technical division of CRA, and will have headquarters in Eureka.

Solar Aircraft Co.
Clifford W. Snider is appointed comptroller of this San Diego company, succeeding *Leon T. Noel*, who has been named vice president in charge of finance. *Captain Charles Antoniak*, USN, ret., joins company as engineering consultant on power plants.

Wyle Laboratories
Robert S. Gardner joins technical staff of this El Segundo firm. He was formerly West Coast technical director of Yardney Electric Corp.

Marquardt Aircraft Co.
Robert L. Earle is elected executive vice president of this Van Nuys firm. He recently joined company as vice president-administration and assistant to president, after 21 years of service with Curtiss-Wright Corp. *Robert G. Francis*, former manager of materiel, is promoted to manager of production engineering and materiel. *Kenneth Hisey* becomes general foreman, replacing *Al Hurlbut*, resigned.

Radioplane Co.
Philip D. Doersam is appointed chief electronics engineer of this Van Nuys manufacturer of target drones and guided missiles. Mr. Doersam has held supervisory positions at Glenn L. Martin Co., Douglas Aircraft Co., and Hughes Aircraft Co.

Resdel Engineering Corp.
Henry K. Abajian is named president of this Los Angeles firm, succeeding *W. E. Osborne*, who retires because of ill health.

American Potash & Chemical Corp.
Calvin L. Dickinson, advisory engineer at firm's Trona plant, is named director of engineering. He was formerly plant manager of organic chemicals division of Diamond Alkali Co. at Houston, Texas.

Pastushin Aviation Corp.
This Los Angeles firm announces appointment of *Barry B. Willis* as vice president-operations. Mr. Willis resigns as vice president of Grand Central Aircraft Co., Glendale, to assume new position.

Swedlow Plastics Co.
John P. Endicott, vice president and treasurer, is named executive vice president and treasurer of this Los Angeles plastic firm. Assuming the dual post of vice president and assistant manager of the company's Los Angeles division is *Paul H. Bottoms*, who is succeeded as secretary by *Wm. O. Fisher*, former assistant secretary.

The Garrett Corp.
James L. Murray and *Emery M. Ellingson* are appointed assistants to the president of this Los Angeles company.

Standard Oil Co. of Calif.
H. G. Vesper, former president of California Research Corp., a subsidiary of Standard Oil, is assigned to direct company's marketing, supply, and transportation activities in Western area. He is succeeded in his former post by *A. L. Lyman*, executive vice president.

Fred Powell is named general manager of Standard Oil's manufacturing department, succeeding *O. N. Miller*, now a vice president. *J. E. Gosline* takes over as manager of producing department, which previously operated directly under *J. E. Toussaint*, vice president.

L. E. Joses retires as Southern District general superintendent of company's pipeline department. He is succeeded by *E. B. Saunders*. *C. L. Reasoner*, contract superintendent, succeeds Mr. Saunders as Southern District superintendent, and *R. R. McGill* replaces Mr. Reasoner.

Kaiser Aluminum & Chemical Corp.
L. B. Harmon is named assistant general traffic manager of Kaiser Aluminum at Oakland. He moves from Chicago, where he has been retail traffic manager for Montgomery Ward & Co. *Dr. John L. Porter* is appointed assistant director of chemical research department of this firm in Oakland, transferring from position as research group supervisor at Kaiser Aluminum's Baton Rouge, La., alumina plant.

Varian Associates
Emmet G. Cameron, works manager, becomes vice president for production of this Palo Alto electronics firm. *Merle R. Zinser*, controller and business manager, assumes post of financial vice president.

E. L. Zebroski
Stanford Research Institute

Stanford Research Institute
Dr. Edwin L. Zebroski joins staff of institute as manager of nuclear engineering section. Dr. Zebroski was formerly project engineer for General Electric's submarine advanced reactor project at Schenectady, N.Y.

Ramo-Wooldridge Corp.
This Los Angeles company forms guided missile research division, staffed as follows: director, *Simon Ramo*, executive vice president of company; vice president for research and development, *R. P. Johnson*, former director of research and development of Hughes Aircraft Co.; associate director, *Louis G. Dunn*, former director of CalTech jet propulsion laboratory; director of aeronautics and structures staff, *Milton U. Clauser*, former head of Purdue University School of Aeronautics; and director of guidance and control staff, *James C. Fletcher*, formerly with Hughes Aircraft Co.

United States Steel Corp.
E. Warren Hunziker becomes division superintendent—open hearth and foundry, Geneva Works of Columbia-Geneva division, succeeding *E. R. Richards*, resigned. Mr. Hunziker's successor as superintendent—open hearth of Pittsburg Works is *Clifford J. McElhaney*, who has been assistant superintendent.

Fletcher Aviation Corp.
Leland C. Launer, executive vice president of this Pasadena firm, is elected president of Fletcher Foundation.

Harvey Machine Co., Inc.
Rear Admiral A. J. Wellings, USN, ret., is appointed technical consultant for this Torrance firm.

COLORADO

Colorado Fuel & Iron
William R. Anderson, mining engineer at this firm's Pueblo plant, is promoted to research engineer of construction materials in quality control department.

Minneapolis-Honeywell Regulator Co.
Stephen A. Keller is named general manager of this company's new Heiland division in Denver.

Atomic Energy Commission
David D. Baker joins AEC as staff engineer to director of exploration division, Grand Junction. He has almost 30 years experience in mining and metallurgical fields, and was last associated with Utah Construction Co. *Otto D. Rohlfs, Jr.*, is appointed administrative geologist in geologic branch of exploration division. A former employee of this division, he recently completed three years active duty in Coast Guard. *Ward Carithers* is appointed to manage division's geologic activities in District 5, which includes eastern Arizona and northern New Mexico. New district geologist of District 6, Grants, N. M., area is *John W. Gabelman*.

John J. Curzon, for past 13 years manager of copper-zinc properties of Howe Sound Co's. Chelan Division, Holden, Wash., is appointed deputy director of mining division of AEC's Grand Junction operations office. *John Wallace Barnes* joins staff of processing division.

HIGH-PRESSURE TESTING

John BEAN

INDUSTRIAL PUMPS

High Pressure: 100 to 10,000 pounds per sq. in.
Low Volume: 1 to 80 gallons per minute.
16 standard, motor driven units completely equipped, ready to install. Special units designed for specific needs.
BEST BUY BEAN, built to last by the world's largest manufacturer of pumps.

Write for Catalog and Prices
FOOD MACHINERY AND CHEMICAL CORPORATION
John Bean Division, P.O. Box 145, San Jose 1, Calif.

STEEL PIPE
VALVES
CHAIN
TANKS
CASTINGS
BOILERS
FITTINGS
PIPE LINES

The FAST, SURE, ECONOMICAL WAY!
fmc

For more details circle No. 98 on Reader Service Postcard

Save Money... Avoid Grief...
Make H & R your Threading Department

Latest Model Landis Threaders with our precision-maintained chasers permit close-tolerance (including Class 4 and 5 fits) at economical production rates. Standard or special thread forms from ¼" to 3" diameter, any length.

You can have one of the West's finest threading departments – at no investment, no increase in payroll! How? Call H & R, where $100,000 worth of modern precision production equipment plus 17 years of specialized threading experience is at your service. You'll get accuracy, cost-cutting efficiency on your requirements for:

THREAD GRINDING—small or large production runs at low cost; prompt service.
STUDS—all materials and sizes.
SPECIAL THREADED PARTS—worms, taps, gauges.
ACME AND SPECIAL THREAD FORMS.
SPECIAL NUT TAPPING—Acme nuts, extension nuts.

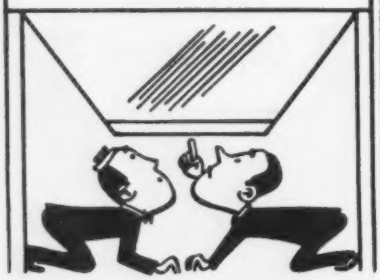
H&R
The Threading Specialists

For practical help on threading problems—or prompt quotations on current needs—phone OLympic 2-1844, or write us now.

HORSPOOL & ROMINE MANUFACTURING CO., INC.
5850 Marshall St.,
Oakland 8, California

For more details circle No. 99

The case of the stymied cinders...



In a Cincinnati outfit handling cinders by the hundreds of tons, production reached a deadlock. Arching and bridging stymied the cinders in their normal course through the bins.

But once again a CLEVELAND vibrator on the sloping side of the bins put an end to costly bottlenecks and equipment downtime.

Tell us about your particular stymie, or ask for our detailed literature. We're sure there's a CLEVELAND to fit your requirements.

AIR *and* ELECTRIC

Bin Stuck Lately?

THE CLEVELAND VIBRATOR COMPANY

2914 Clinton Avenue • Cleveland 13, Ohio

For more details circle No. 226

WESTERNERS AT WORK

IDAHO

Inspiration Lead Co.

R. R. Weideman is named mine manager and superintendent for this company, now carrying on exploration and development work near Wallace, Idaho, and Troy, Montana.

NEVADA

Titanium Metals Corp. of America

Rex R. Loyd joins staff of this company at Henderson, resigning director's post of Buerau of Mines Office in Boulder City.

Nevada Southern Gas Co.

Officers of this new Las Vegas company are: president, *Harold G. Laub*, president of Southwest Gas Corp. and Nevada Natural Gas Pipe Line Co., and vice president, *William M. Laub*.

NEW MEXICO

Kennecott Copper Corp.

Joseph Brubaker heads new industrial engineering department at company's Chino Mines division. He was formerly chief of methods and standards branch, Ogden Air Material Area, at Hill Air Force Base in Utah.

WE'VE GOT IT . . .

STAPLE WIRE

YOU SAY WHEN . . .
WE'LL HAVE IT THERE!

INDUSTRIAL Wire PRODUCTS CORPORATION

5649 ALHAMBRA AVE. • CA 27131
LOS ANGELES 32, CALIFORNIA
431 WESTWOOD DR. • PL 5-5463
SAN ANTONIO 12, TEXAS
4868 PINE ST. • HO 9-3752
LA MESA, CALIFORNIA

For more details circle No. 227

Ray C. White is appointed industrial relations supervisor for company's Chino Mines division in Hurley and Santa Rita. Mr. White recently retired from the Navy after 23 years of service. *James K. Richardson* becomes assistant general manager in charge of labor, public, and industrial relations at Chino Mines division. He last held the post of general manager of Utah copper division in charge of public, industrial and labor relations.

Atomic Energy Commission

Henry L. Johnson is appointed director, engineering and construction division, at AEC's Santa Fe Operations Office. He succeeds *Ralph P. Johnson*, recently appointed assistant manager of Santa Fe operations.

Phelps Dodge Corp.

Elton Clark is named chief engineer of mining operations of company's Burro Mountain Mine at Tyrone. He succeeds *Paul Yates*, deceased.

Sandia Corp.

Timothy E. Shea leaves this Western Electric Co. subsidiary in Albuquerque to become vice president in charge of manufacturing in Eastern area. He is succeeded as vice president and general manager at Sandia by *Max H. Howarth*, formerly manager of company's plant at Tonawanda, N. Y.

Duval Sulphur & Potash Co.

W. Page Morris, manager of New Mexico operations of this firm, is promoted to assistant general manager of company. *George Atwood* will succeed him, and *Jerry Tong*, mine superintendent, will replace Mr. Atwood as assistant manager.

Potash Co. of America

C. E. Bothwell retires as purchasing agent for this Carlsbad firm, but will continue to serve company as purchasing associate for two years. He is replaced as purchasing agent by *A. H. Beidel*, former assistant purchasing agent.

OREGON

Pacific Power & Light Co.

E. O. Thoman is promoted from district maanger at Corvallis to become assistant to the general manager of this Portland company. He is succeeded by *Dan Webster*, former manager at Seaside, who is replaced by *Kenneth A. House*. Mr. House's position as Hood River district manager will be filled by *Wilfred C. Sundby*, former Pendleton sales supervisor.

Beebe Co.

John W. S. Platt, former secretary of Kerr-Gifford & Co., becomes vice president and treasurer of this firm.

Reynolds Metals Co.

E. J. Appel is elected vice president of Reynolds Reduction Co., subsidiary of Reynolds Metals. Mr. Appel was recently named general manager of Western reduction division of this firm.

Electric Steel Foundry Co.

R. W. deWeese is named vice president in charge of sales and branches of this Portland company. *Jefferson J. Davis* is promoted to post of vice president in charge of product divisions.

M & M Wood Working Co.

Clay Brown, chairman of the board of Fortuna Sawmills, Inc., is elected president of this Portland firm. At one time, Mr. Brown served as sales manager for M & M.

Farm Forestry Program

New head of program in Washington, Columbia, and Yamhill Counties is *Kenneth Palen*, succeeding *Ralph Yeater*, who transfers to Salem headquarters.

Moore Dry Kiln Co. of Oregon

Gordon A. Duncan is elected president of this Portland company, to succeed *Joseph I. Steel*, deceased.

West Coast Lumbermen's Assoc.

R. G. Kimbell, Jr. *R. T. Dickerson*

Richard Guy Kimbell, Jr., joins the staff of this organization as assistant to director of technical services, relieving *George D. Ward*, staff engineer, who is preparing a book on Douglas fir use. *Raymond T. Dickerson* is named general auditor and office manager of Association and of West Coast Bureau of Lumber Grades and Inspection.

WASHINGTON

Weyerhaeuser Timber Co.

H. B. Campbell, manager of company's Klamath Falls branch, will retire at end of this year after 28 years with Weyerhaeuser. His successor will be *David S. Troy*, who has moved to Klamath Falls from general sales offices in St. Paul, where he formerly served as executive assistant to manager of division operations. *Harry E. Morgan*, Longview lumber division manager, retires and is succeeded by *W. H. Robertson*, former assistant manager.

Preservative Paint Co.

This Seattle company adds to its staff, now working on a floor covering and applicator which are patented in Germany, *K. E. W. Oesterreich*, a German chemist.

Simpson Logging Co.

New assignments to insulating board plant at Shelton are: *Gil Oswald*, plant manager in charge of both production and sales; *Don Proudfoot*, manager of acoustical department; and *Woodrow Johnson*, production superintendent.

American Smelting and Refining Co.

Paul Thomas Benson retires as general superintendent of Tacoma smelter, a position he held since 1947. He is succeeded by *Charles R. Low*, former assistant general superintendent, whose successor is *Martin L. Plass*.

WYOMING

Ohio Oil Co.

Harold H. Healy, manager of company's Casper division since 1942, retires and is succeeded by *Rolland W. McCanne*, assistant division manager.

ASSOCIATIONS ELECT

Air Force Assoc.:

President, *John R. Alison*, vice-president, administration, Northrop Aircraft, Inc.

Night Fighter Assoc.:

President, *J. G. Nettleton*, director of military relations, Northrop Aircraft, Inc.

California Olive Assoc.:

President, *G. K. Patterson*, Sunland Olive Co., Terra Bella; vice president, *Frank J. Oberti*, G. Oberti & Sons, Madera; secretary-treasurer, *Miss Erline Hevel*.

Pacific Coast Gas Assoc.:

President, *E. D. Sherwin*, San Diego Gas & Electric Co.; vice president, *Guy W. Walsworth*, Southern Counties Gas Co.; treasurer, *Harry McGann*, Pacific Gas & Electric Co.; managing director, *Clifford Johnstone*; assistant manager, *J. E. Kern*.

American Ordnance Assoc., Los Angeles post:

President, *Robert C. Geffs*, (re-elected), Clary Multiplier Corp.; vice president, *E. C. Hummell*, Utility Steel Foundry; secretary, *Robert W. Reiners*, Standard Coil Products; treasurer, *Samuel K. Rindge*, Citizens National Bank.

Plant Engineers Society of Los Angeles:

President, *Francis Rogers*, A. O. Smith Corp.; vice president, *T. H. Hardgrove*, Aerojet-General Corp.; secretary, *James Morris*, Aluminum Co. of America. (New organization.)

WANTED

California concern would like items to manufacture on Royalty basis or thru purchase of patent, or would like to arrange with present manufacturer East of Rockies for manufacturing rights.

List of plant facilities will be forwarded upon request, and will supply financial statement to responsible parties.

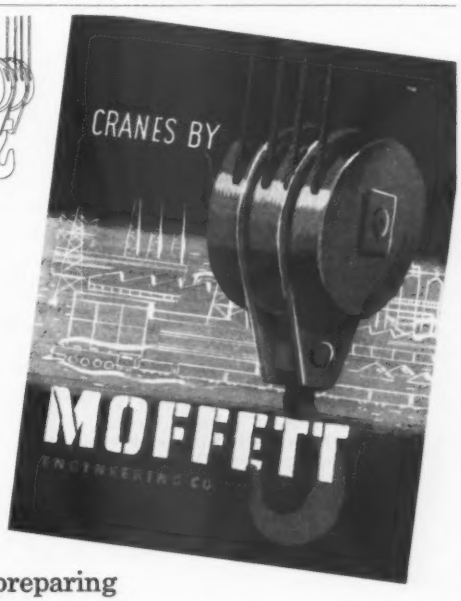
PROGRESSIVE MACHINE CO.

5981 Maywood Ave.

Huntington Park, California

For more details circle No. 228

Get this helpful booklet



32 pages. Describes MOFFETT crane types. Pictures 110 "plant individualized" installations. Includes Crane Inquiry form for preparing specifications. Write for your free copy NOW. 7

Traveling Cranes · Hoists

MOFFETT ENGINEERING COMPANY

579 Cleveland Ave., Albany, Calif. • LAndscape 5-4916
3930 N. Mission Rd., Los Angeles 31 • CApital 2-7161
15 Park Row, New York 38

For more details circle No. 229 on Reader Service Postcard

TRADE WINDS

Tagged for Caterpillar

A 40,000 sq. ft. parts warehouse depot is now under construction in East Los Angeles for long-term lease to Caterpillar Tractor Co. Realtor is Gateway Property Co. and building contractor F. R. Orr Construction Co. Approximately $300,000 will be invested in building, land, and equipment. Warehouse will serve Southern California, Arizona, Nevada, and Mexico.

Changes for Honeywell in West

New Pacific regional sales manager for Minneapolis-Honeywell Regulator Co., with offices in Los Angeles, is Geogre Maves. He succeeds Gavin S. Younkin, recently transferred to firm's executive offices in Minneapolis as new sales manager. Mr. Maves has been with Honeywell for 20 years, since 1948 as Boston sales manager.

Micro Switch division of Minneapolis-Honeywell appoints Emmett N. Hughes as Western sales manager, in charge of all sales operations in division's newly organized Western section, which includes West Coast and Rocky Mountain states, with offices in Los Angeles. Mr. Hughes was formerly West Coast division manager for Micro Switch.

Training schools

Delta Power Tool Division of Rockwell Manufacturing Co., Pittsburgh, is sponsoring a series of three training sessions on the West Coast for intensive one-week training of its sales representatives. Second of the series was recently held in Oakland, Calif., over a three-week period, with about 12 trainees going through the course each week. Besides "book learning," course includes demonstration and actual operation of all Delta machines. Warren Richter, Denver-Salt Lake City district manager, and John McCrossen, Northern California district manager, conducted the school, with help of C. G. Spring, Bay Area sales representative.

New agency for Kuhlman Electric

Maydwell & Hartzell, Inc., San Francisco, is appointed Western sales agency for Transformer Division of Kuhlman Electric Co., Bay City, Mich. M&H has branch offices in Seattle, Spokane, Portland, Los Angeles, San Diego, and Phoenix, and four warehouses in this territory, which will serve users of Kuhlman transformers.

Triangle bulletins

James F. McLaughlin is named general manager of Triangle Steel & Supply Co., Vernon, Calif. He has been with company since 1949. Before that he was in steel jobbing in Los Anglees for about thirteen years, operating his own steel warehouse for a part of that time.

Triangle Steel is appointed a distributor of wire rope by Bethlehem Pacific Coast Steel Corp., Los Angeles. Company now stocks a wide range of other Bethlehem steel products and will extend this with diversified sizes, grades, and types of wire rope.

Pioneer dealer in Bay Area

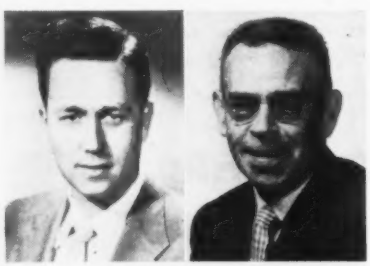
Earl M. Jorgensen Co., Oakland, Calif., becomes a distributor for Pioneer Tool Engineering, Inc., El Segundo, Calif., producer of cast aluminum tooling and production plates and bars.

Clark trucks for Eureka

Eureka Boiler Works, Eureka, Calif., is appointed by Industrial Truck Division of Clark Equipment Co. to sell and service its fork-lift trucks and other materials handling equipment. Company's territory takes in counties of Siskiyou, Del Norte, Humboldt, Trinity, and Mendocino.

Ryerson's Anderson

Harry E. Anderson is appointed special sales representative for Ryertex-Glyco division plant of Joseph T. Ryerson & Son, Inc., at Seattle. He has been with company since 1948, for the past five years with this division, and in his new position will sell Ryertex bearings for industrial and marine use, Ryertex industrial plastic, Carlon plastic pipe, and Glyco babbitt metal.



H. E. Anderson
Joseph T. Ryerson & Son

J. M. Colling
Hamerslag Equipment Co.

Colling joins Hamerslag

James M. Colling is appointed special sales representative in charge of government sales, and administrative assistant to sales manager, for Hamerslag Equipment Co., San Francisco. He was formerly with Industrial Service Co. and Bassick Co.

Pick Denver firm

Landes, Zachary and Peterson Co. of Denver is appointed new Elwell-Parker distributor for states of Colorado, Wyoming, Utah, and New Mexico. Company which recently constructed new Denver office and warehouse, has sales representatives for materials handling equipment in Salt Lake City, Albuquerque, and El Paso, and Casper, Wyo.

Hillman with Lewis-Shepard

V. A. Hillman is named sales and service representative for Lewis-Shepard Products, Inc., in Washington, Northern Idaho, and Alaska, working out of a Seattle office. Associated with him are J. Keith Cleveland, formerly with du Pont, and W. B. Heil, who during the war years was a director of materials handling for U. S. Navy.

Swanson moves to Bay Area

Knute Swanson is named industrial salesman in Bay area of California for Snap-On Tools Corp., Kenosha, Wis. He moves from Medford, Ore., where he has been a Snap-on dealer since 1947.

Westward for Tapecoat

L. R. Zito heads new West Coast office recently opened in San Lorenzo, Calif., by Tapecoat Co., Evanston, Ill. He transfers from post of district manager in New York area, where he supervised sales and service in 12 Eastern states. Teritory of new Tapecoat office includes California, Oregon, Washington, Idaho, and Nevada.

O-rings for Nor-Cal

Parker Appliance Co., Cleveland, appoints Nor-Cal Supply Co., Oakland, as distributor of Parker o-rings, synthetic rubber o-ring for sealing.

High precision move for CMP

Cold Metal Products Co. of California ocupies new warehouse and offices at 2131 S. Garfield Blvd., Los Angeles, expanding its services on high precision steel specialties. Recent changes and additions to sales division personnel include: Phillip W. Messer, formerly with Chase Steel and Supply Co., Los Angeles, becomes product manager, stainless division. L. W. Renk, former assistant sales manager, becomes manager of the order department, and is succeeded in his past post by William E. Brady of the sales department.

Ebasco opens Portland office

William F. Rooney is appointed head of new Portland office of Ebasco Services Inc., engineering, construction, and business consulting firm with offices also in East. Mr. Rooney, who has wide experience in utility and industrial fields, joined Ebasco in 1950 as a sales consultant and since 1953 has been a new business representative.

Krumholz joins DoAll

Thomas L. Krumholz is appointed to sales engineering staff of cutting tool and inspection equipment division, DoAll San Francisco Co. He was formerly with Minneapolis Honeywell Co. in manufacturing division, and has worked in fields of tool and die making and tool engineering.

More space

Pacific Scientific Co. moves its Seattle facilities to a new 5,000-sq. ft. building, with double the working area of former quarters. This division office provides overhaul and service work on instrumentation, electrical, and mechanical products.

Westinghouse bulletin

Charles K. Massey is named regional industrial heating sales engineer for Westinghouse Electric Corp. on Pacific Coast. His offices will be in San Francisco, where he transfers from company's industrial heating department headquarters at Meadville, Pa.

Men in White

White Motor Co., which recently reorganized its Pacific Coast region to cover the whole West, makes the following appointments: R. W. Cochran, former manager of Los Angeles branch, will be in charge of factory branch in Rocky Mountain Area, with headquarters at Denver. Fred Ragen, last stationed at Salt Lake City as wholesale manager, will transfer to Denver to direct sales and service programs there. L. A. Fleener succeeds Mr. Cochran as manager of Los Angeles branch. He has served for past two years as assistant to regional manager.

A. S. Kininmonth *Reading Overstreet*
Overstreet & Kininmonth Co.

Phoenix company serves Rucker

Overstreet & Kininmonth Co. are picked to represent Rucker Co. of Oakland, Calif., in states of Arizona and New Mexico, handling industrial and agricultural hydraulic units and components. Company, which is headed by Reading Overstreet and Arthur S. Kininmonth, operates a crop-dusting service in addition to sales activities.

Berkeley extends services

Berkeley Division of Beckman Instruments, Inc., Richmond, Calif., organizes national network of analog computing and simulation facilities for interchange of information on new equipment and experience developed by network members. Dynalysis, Inc., of Los Angeles is a second California firm in the network, which includes four other independent organizations in the rest of the United States. Berkeley Division has also set up new engineering group at its Richmond headquarters to provide service on design, construction, and installation of industrial recording and control systems. Group is headed by Wallace E. Rianda.

Valley Electric

Valley Electric Co., Stockton, Calif., is named a distributor for Allis-Chalmers transformers in San Joaquin, Contra Costa, Stanislaus, and Merced counties.

Drake Steel moves

Drake Steel Supply Co. moves to warehouse and offices at 6105 Bandini Blvd., Los Angeles.

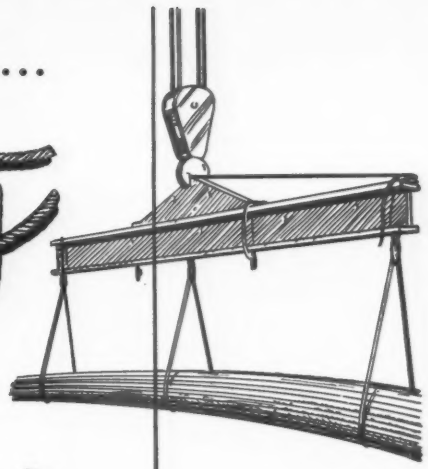
Spokane now Equipment-Supplied

Equipment Supplies, Inc., of Seattle opens New Spokane office and warehouse to serve equipment manufacturers, including American Pulley Co., Food Machinery and Chemical Corp., Ideal Stencil Machines., Chatillon Scales Co., and Premier Vacuum and Floor Machines Corp.

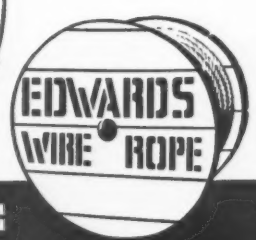
In Materials Handling . . .

Safety

starts with
DEPENDABLE
WIRE ROPE



Always specify
EDWARDS
WIRE ROPE
in your plant



EDWARDS WIRE ROPE
E. H. EDWARDS COMPANY
General Office: South San Francisco, Calif., Los Angeles · Houston · Seattle · Portland

For more details circle No. 230 on Reader Service Postcard

Your Water Treatment Problem
and how to handle it

A booklet covering the essentials of water analysis, filtration, softening, scale removal, cost reduction by re-circulation, cooling tower efficiency.

Plus

a tabulation of water analyses for hundreds of cities in the eleven Western States.

This is a reprint of a series of articles which appeared in *Western Industry* in 1950-1951. The tabulation of water analyses is the only thing of its kind available anywhere.

Single copies	50c each*
25 copies up	30c each*
50 copies up	20c each*

*When ordering in California, add 3% Calif. sales tax.

Available from

WESTERN INDUSTRY

Use This Coupon

WESTERN INDUSTRY
609 Mission Street
San Francisco 5, Calif.

Please send me . . . . copies of your water booklet. Check for $. . . . . (including Calif. sales tax enclosed.)

Name . . . . . .

Address . . . . . .

. . . . . .

For more details circle No. 231 on Reader Service Postcard

Is depreciation "anybody's guess?"

Depreciation is an important and measurable element in determining costs, profits, and taxes. Through property analyses and remaining life studies, the factor of variance in measuring depreciation may be reduced to a very narrow range.

The AMERICAN APPRAISAL *Company*

Over Fifty Years of Service

OFFICES IN PRINCIPAL CITIES

For more details circle No. 232

REVOLVATOR
RED-GIANT
features
Safety-Ease

Durability — built in by 50 years of Revolvator Co. experience—is still the fundamental of the Red Giant liftruck line. Maneuverability, plus the safety of their exclusive double stroke mechanism, make the models shown leaders in their fields. There is a Red Giant liftruck available for every use—for every capacity.

Write for the full facts today.

REVOLVATOR CO.
8798 Tonnele Ave., North Bergen, N. J.

For more details circle No. 233

TRADE WINDS

Wire rope for Washington

Columbia Tractor Co., Wenatchee, becomes a distributor of wire rope made by Bethlehem Pacific Coast Steel Corp. Complete stocks of wire rope are added at company's stores in Wenatchee, Okanogan, and Ephrata.

Heads resin sales

Rex D. Brookhart is appointed sales manager for plastics tooling materials by Furane Plastics, Inc., Los Angeles. He has many years of experience in plastics tooling field, and was last with Wal-Mar Plastics, Inc., of Los Angeles as head of plastics sales and tool development.

Stocking more steel

Howard Supply Co., Vernon, Calif., expands warehouse facilities and stocks to include all types of steel: bars, shapes, plates, sheets, structurals, strip, tubing, cold drawn bars, pipe, and floor plate.

West moves in Northwest

Northwest Division of West Disinfecting Co. moves into new expanded quarters at 1738 Fourth Ave. S., Seattle. Division serves Montana, Idaho, Washington, Oregon, California, and Alaska.

New Albuquerque office chief

Victor V. Myers, Jr., is named field engineer in charge of newly-formed Albuquerque district of CEC Instruments, Inc., sales and service subsidiary of Consolidated Engineering Corp., Pasadena, Calif. He joined company over a year ago as an application engineer in technical services department.

Manager—Western operations

Philip H. Marsh heads expanded West Coast activities of Flexible Tubing Corp., of Guilford, Conn., maintaining offices in Pasadena, Calif. He is in charge of a proposed warehouse and assembly project, as well as supervision of distributor sales, and will personally direct sales to aviation and equipment markets.

From coast to coast

A. W. McGuire is appointed product manager for National O-Rings, manufactured by National Motor Bearing Co., Inc., of Redwood City, Calif. He will work with district sales offices throughout the country, specializing in engineering, application, and sales of O-Rings. Mr. McGuire was formerly assistant sales manager of National Motor Bearing's Arrowhead Rubber Co. division.

Aluminum welding fittings

Pacific Metal Co., Portland, adds new line —Tube-Turn aluminum welding fittings and flanges manufactured by a division of National Cylinder Gas Co.

Door man

George F. Glore is appointed sales manager of Durand Door Supply, Los Angeles. He has been with company since shortly after its start in 1949.

Represent Palmer-Shile

Western sales representative added this year by Palmer-Shile Co. of Detroit is W. P. Wooldridge. Co., San Francisco.

Aero-Coupling sales manager

Charles W. Sawhill is named general sales maanger of Aero-Coupling Corp., Burbank, Calif., subsidiary of Aeroquip Corp., Jackson, Mich. He takes charge of industrial and aircraft accounts in the Pacific Coast states. Formerly industrial sales manager of Aero-Coupling, Mr. Sawhill was at one time affiliated with Douglas Aircraft Co.

C. W. Sawhill
Aero-Coupling Corp.

J. C. Mackey
Kaiser Steel Corp.

Kaiser Steel in Phoenix

Sales office is opened in Phoenix, Ariz., for Kaiser Steel Corp., headed by John C. Mackey. Mr. Mackey transfers from company's Southern District sales office in Los Angeles.

Spotlight on aircraft radios

AiResearch Aviation Service Division of Garrett Corp., Los Angeles, sets up new radio and electronics department to handle aircraft radio sales, engineering, design, and installation, as well as service and repair of equipment for aircraft communications and navigation. Harold Jeffrey, formerly with Hughes Aircraft, is in charge of new department, with George Lewison, who moves from AiResearch Aviation Service, as foreman.

HiDuty distributors

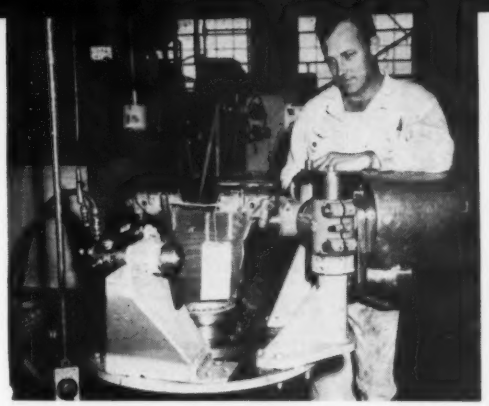
Transitier Truck Co., Portland, picks following distributors on Pacific Coast for its HiDuty fork lift trucks: Hallidie Machinery & Equipment Co. of Portland; Hallidie Machinery Co. of Seattle, and Roll-Rite Corp., Oakland.

Airsupply adds Kwikset line

Airsupply Co., a division of Garrett Corp., of Beverly Hills, Calif., is appointed representative for Kwikset Powdered Metal Products.

Buy Arizona firm

Garrett Corp. of Los Angeles acquires McConkey-Docker and Co., Phoenix industrial supply house, to be operated as a branch company. Manager will be Henry Turner.



NEW MACHINE provides greater accuracy in alignment of components for re-boring exhaust ports.

BORING MACHINE

AN EXTREMELY ACCURATE exhaust port boring machine has been built by the Pacific-Alaska Division of Pan American World Airways as an aid to aircraft engine maintenance. It is believed that the new engine will provide greater accuracy in alignment of the various components of engine exhaust systems than has ever been possible before. It will permit a semi-skilled workman to do a job which calls for very close tolerances, on a single machine, in the center of the engine overhaul shop's production line.

In the past, when worn exhaust ports needed re-boring, the cylinder had to be set up in a radial drill or boring mill in the machine shop—a job requiring the services of a skilled mechanic. There was no provision for accurately checking the alignment of the cylinder head with the barrel during the process. The installation of new nipples in the exhaust ports to provide a connection with the exhaust manifold required hammering into place by hand.

Now, on the new machine, which consists of a circular steel table on which are mounted a standard mill head and a built-in mechanically operated press or ram, a series of index position locks line up the cylinder barrel and head during the boring operation and also assure that the nipple is installed at the proper angle and depth.

SAFETY ANSWER

THE DIFFICULTY of planning a safety program in a plant where every part is a prototype and every part requires a different set-up, has been overcome by Marquardt Aircraft Co., Van Nuys, Calif., as follows:

To replace the former 22-man safety committee, which he considered too large to be functional, a 12-man committee with six permanent and six rotating members, was set up by E. F. Thomas, assistant manager of industrial relations.

Committee members were identified by a special plant badge and sub-committees were formed to investigate each accident, calling on different members of the group each time. Outside speakers were brought in to keynote safety meetings and the committee's activities were publicized in the plant newspaper.

The program was started in March, results began to show up in April, and since then Marquardt has not recorded a single lost time accident.

For more details circle No. 234 on Reader Service Postcard

There's a *Big* difference in steel buildings...

Handsome-looking! Most of it is a Butler steel building. Small difference in price—big difference in looks and performance.

take BUTLER factory shearing and punching for instance...

Watch 'em *erect* steel buildings if you want to find out why it makes such a *big* difference when it's a Butler. Every Butler structural fits. Every bolt hole lines up. Every panel joins exactly. No extra field tailoring.

Butler buildings are precision-formed in huge factories. Precise gang punching, drilling and jig-controlled shearing make each part match the engineer's specifications. Manufacturing precision makes Butler buildings permanent, attractive, climate-proof. Precision is just ONE feature that makes Butler your best buy. Mail coupon today for all the facts.

BUTLER

Manufacturers of Oil Equipment
Steel Buildings • Farm Equipment
Dry Cleaners Equipment • Special Products

Factories at:
Kansas City, Mo. • Galesburg, Ill. • Minneapolis, Minn.
Richmond, Calif. • Houston, Texas • Birmingham, Ala.

For prompt reply address office nearest you:
BUTLER MANUFACTURING CO.
Dept. 72A, Richmond, Calif.

Please mail more information on Butler steel buildings.

Name_____

Firm_____

City_____ State_____

For more details circle No. 235

CLASSIFIED SECTION

100 GENUINE 8 x 10 PHOTOS 10¢ ea

24 HOUR SERVICE!

FREE DELIVERY ANYWHERE

MADE DIRECT FROM PHOTOS (OR NEGATIVES) • 50 8 x 10 13c ea. 500 8 x 10 8c ea.

1000 8 x 10 GLOSSIES 7¢ EACH

POSTCARDS

5000 $21 PER M. 2½¢ each in 1000 lots

SAVE THROUGH QUANTITY PRODUCTION

FOR COMPLETE PRICE INFORMATION WRITE OR PHONE:

QUANTITY PHOTOS, Inc.

HOllywood 7-6179

5509 SUNSET BLVD., HOLLYWOOD 28, CALIF.

LARGEST PHOTO REPRODUCTION PLANT IN WEST

USE "CLASSIFIEDS"

Space is sold as advertisers' inches. All advertisements in this section are ⅛ inch short of contracted space to allow for borders and composition. Rates are $7.50 a column inch. Copy should be sent in by the 25th of preceding month if proofs are required; by the 28th if no proofs are required.

SANTA MARIA AIRPORT

Half-Way Between Los Angeles and San Francisco

Buildings now available for lease from 3,000 to 25,000 sq. ft. Reasonable rates. Excellent labor market. Railroad siding. Streets, roads, sewage, natural gas, water, electricity. Surfaced around buildings. Ideal living conditions. Moderate climate.

For Information Write or Call

J. F. Brians, Mgr.

Santa Maria Public Airport, Box 70
Santa Maria, Calif. WAlnut 5-1406

200 Tons of New Replacement Parts for **Clark—Towmotor—Hyster—Ross** fork lift trucks at **SUBSTANTIAL DISCOUNTS.**

THE BOMAN COMPANY
3316 E. Olympic Blvd.,
Los Angeles 23, Calif.

Want Ad Order Blank

Please run my ad 12, 6, 1 time (circle which) at the rate of $7.50 a column inch. Make ad 1, 2, 3 columns wide (circle which) by .....inches (specify, one to 10) deep.

Signed.....

Address.....

City.....**State**.....

WRITE AD HERE:

.....

.....

.....

.....

.....

.....

.....

.....

Send ad to Classified Dept.,
WESTERN INDUSTRY, 609 Mission St., San Francisco 5, Calif.

FAST SAWING
Sintered tungsten carbide effective

MORE THAN 120 miles of aluminum have been cut by two novel power saws, without appreciable wear to the blades, at Fletcher Aviation Corporation, Pasadena, Calif.

Kennametal (sintered tungsten carbide) blades used to cut the 118-inch 3SO aluminum have never needed to be changed or sharpened on the saws during all this time.

The saws were designed by Fred Dillon, chief tooling engeineer for Fletcher. He saw the need for an extremely tough and wear-resistant cutting metal to insure a precision fit for the six-foot indentation that mounts over the wing tip on 230- and 250-gallon Fletcher tanks. Nearly 60,000 straight-center section Fletcher tanks have gone through the saws since they went into operation 22 months ago.

Mr. Dillon designed the big power tools in three weeks and they were built and operating a month later.

Before the saws with Kennametal blades were used, it took four men with hand-operated routers to complete 150 cuts per day. This caused a serious bottleneck in the fast-moving Fletcher production line. Now, besides the saving on wear of the blades, the whole process has been greatly speeded up.

The eight-inch saws, powered with two three-horsepower motors, turn at the rate of 3,000 revolutions per minute, with a 25 feet per minute rate of feed. A combination of compressed air and hydraulic force maintains a smooth driving power for the six-foot cut of each saw.

Kennametal, the material of which the saw blades are made, is a powder metallurgy product having as ingredients tungsten and titanium carbides and cobalt. Next to diamond in hardness, this carbide has a strength, rigidity, and wear-resistance that makes it far superior to other cutting metals, according to the manufacturer.

VIBRATION TESTER

A MEANS of reducing the danger of air disasters due to vibration has been developed in Los Angeles in the largest generator of electronic power supply ever built for electromechanical vibration testing, with a power output of 20,000 watts. It was recently completed by LM Electronics, Inc., after several years of development work, and delivered to Hughes Aircraft, Inc.

THE West ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS, DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

Prudential's panel forecasts upturn

Sixty-four per cent of the firms in Prudential Insurance Co.'s Western Business Panel expect the fourth quarter of 1954 to be equal to or better than the same results a year ago.

Fifty-five per cent look for increases in volume ranging from 1% up to 40%; 36% expect business to be down; and 9% unchanged.

Seventy-three per cent expect the fourth quarter will equal or exceed the third quarter, and over half of this percentage expect their business to remain steady or gain as much as 10%.

Advertising and sales promotion figures indicate that 61% will spend more money in 1955, primarily because of more intense competition and/or expansion of operations.

Population forecast for 1990

Population of the nine San Francisco Bay Area counties may double by 1990, says Walter Douglas, a partner in Parsons, Brinckerhoff, Hall and Macdonald, an engineering survey firm presently considering the best type of transit system for the San Francisco Bay Area.

Aircraft figures

Aircraft employment for the period ending with the second quarter of 1954 on the West Coast averaged 260,000; typical weekly payroll was $24,730,994; backlog was $5,755,987,401; and plant area 58,883,827 sq. ft. as reported by the Aircraft Industries Association.

For the Los Angeles area the figures were: employment, 173,765; typical weekly payroll, $17,046,210; backlog, $3,958,940,075; plant area, 29,952,173 sq. ft.

Arizona population and income

Arizona's estimated population for 1954 is 950,000, a gain of about 200,000 over 1950, according to the Arizona Statistical Review published by the Valley National Bank of Phoenix. In 1940 the population was 499,261, a little more than half the 1954 figure.

Population of Phoenix is estimated at 140,000, compared to 106,818 in 1950; Tucson estimate 54,000, as against 45,454 in 1950.

Sources of income for 1953 were reported as follows:

Crops	$315,621,000
Manufacturing	312,000,000
Mining	240,697,000
Tourists	150,000,000
Livestock	99,502,000

Rocky Mountain nuclear group

Nine companies are joining in a new association to be known as the Rocky Mountain Nuclear Study Group, to study at their own expense the economic and engineering possibilities of a nuclear power reactor for the Western United States.

The new group is composed of: Arizona Public Service Company, Phoenix; Ebasco Services, Inc., New York; Fluor Corporation, Ltd., Los Angeles; Idaho Power Company, Boise; Minnesota Mining and Manufacturing Company, St. Paul, Minn.; Phillips Petroleum Company, Bartlesville, Okla.; Public Service Company of Colorado, Denver; Riley Stoker Company, Worcester, Mass.; Utah Power and Light Company, Salt Lake City.

First study will be the possibility of a reactor, cooled and moderated by light water, fueled with slightly enriched uranium, and designed for the purpose of producing both power and fissionable material. The group will then study the economic feasibility of other types.

The agreement is for one year, with the AEC making available needed information to cleared personnel of the group. At the conclusion of the year, the group will report its findings to the AEC and make recommendations on the practical applications of atomic power and the role of industry in carrying out these applications.

Ten full-time employees will be assigned by the companies to the study, and in addition each company will contribute $5,000 to defray the costs. Headquarters for the group will be at Idaho Falls.

Columbia River report optimistic

Things are looking up in the Columbia River area, a survey by the Columbia Empire Industries indicates. The following replies were received to the question "What is the general situation of your business compared to a year ago?":

Better	94
Same	52
Poorer	49

For the question as to prospects for the remainder of 1954, the replies were:

Better	98
Same	84
Poorer	9

Fifty-one firms in the organization have increased their total employment by 1,481 employees compared to a year ago, while 96 firms had the same number and 41 decreased by 789 employees.

Sales force increases totaled 93 people for 39 firms, and 35 firms increased their advertising $109,000 over a year ago.

Thirty-five firms expanded their buildings for a total of $17,117,000 while 40 firms purchased equipment to the extent of $7,320,600.

A section of the November 1954 issue of WESTERN INDUSTRY — 609 Mission Street, San Francisco 5, Calif.

ALASKA

URANIUM—Eight uranium claims are filed in Happy River area 150 mi. northwest of Anchorage, touching off a prospecting rush.

ARIZONA

PROFITS FROM PINON — Research group made up of representatives of University of Arizona, Arizona State College, University of California College of Agriculture, and Navajo Reservation finds commercial possibilities in pinon resin, which is reported to be suitable for varnish, chemicals, disinfectants, soap, and paint manufacture.

MORE POWER—Arizona Public Service Co. will build its planned $13,000,000 Ocotillo steam electric generating plant on 160-acre site east of Tempe. Plant, to be completed within three years, will add 100,000 kw. to electric power supply. New electric substation is nearing completion in industrial area of southeast Phoenix, built at cost of $190,000.

GARRETT GROWS — Another $400,000 improvement program is undertaken by Garrett Corp. of Los Angeles at its AiResearch plant in Phoenix. Additional space will be used for assembly and overhaul, painting, process laboratory, and new plating shop. Garrett Corp. also acquires through purchase McConkey-Docker and Co., Phoenix industrial supply house, to be operated as branch company by Garrett Supply division.

START BABB PLANT—Contract for erecting first three buildings of new Sky Harbor plant of Babb Co., Inc., is awarded Homes and Son, Phoenix. To be completed by February 1955, buildings include two warehouses and a combined machine shop and offices, totaling 157,200 sq. ft. of floor space. Buildings will be owned by local syndicate of investors and leased to Babb for jet engine overhaul.

PACE - SETTER — Arizona Citrus Growers opens new citrus packing plant in Phoenix, built by Homes and Son. Plant, said to be one of most modern in United States, increases production capacity by one third with one fourth less floor space than former plant.

SPECIAL FEATURE — Goettl Bros. Metal Products Co., Phoenix, opens new $100,000 plant for sheet metal work and air-conditioner dealership, which features a show window on second floor for merchandise display. Company will continue to operate its former plant, employing 60 persons at the two locations.

ON THEIR WAY—Copper anodes, stacked here for shipment from Douglas reduction works of Phelps Dodge Corp., are now being turned out from ore mined in company's new Lavender pit and concentrator operations, which opened recently near Douglas, Ariz.

CALIFORNIA

BORDEN BUILDS — Chemical Division of Borden Co. is adding new polymerization unit next to company's industrial adhesives plant in Dominguez, Los Angeles County, to be in operation in January 1955. Unit will produce at start 3,000,000 lb. yearly of emulsion polymers for paint manufacture.

NEW PRODUCTS FOR WEST—American Pipe & Steel Corp., Alhambra, contracts with Bowser, Inc., of Chicago to manufacture several Bowser products for sale in West, among them heavy industrial tanks, dehydrators for jet fuel, and smokeless incinerators.

QUAKER PIONEER—West Coast operations of Quaker Rubber Corp. and its recent acquisition, Pioneer Rubber Mills, Pittsburg, merge under the name Quaker Pioneer Rubber Mills, Division of H. K. Porter Co. Quaker Pioneer buys lawn hose division of Extruders, Inc., Hawthorne, which will continue to manufacture polyethylene film.

SERVICING JETS — Pacific Airmotive Corp., Burbank, under a service agreement with McDonnell Aircraft Corp. of St. Louis, is supplying skilled personnel to handle servicing and maintenance of McDonnell's jet fighters during flight test program at Edwards Air Force Base.

WESTON JOINS BORG-WARNER — Weston Hydraulics Limited, North Hollywood, is acquired by Borg-Warner Corp. of Chicago through exchange of stock. New subsidiary will continue to manufacture hydraulic and pneumatic equipment for aircraft industry, under present management.

MORE RESEARCH SPACE—Shell Development Co. plans to buy and remodel three buildings adjoining its Emeryville research center when they are vacated next spring by present owners, Western Electric and Pacific Telephone and Telegraph companies. Additional space totaling about 190,000 sq. ft. will be used for research and development in oil and chemical fields. Purchase requires approval of California Public Utilities Commission.

NEW PHOSPHATE PLANTS—J. R. Simplot Co. of Caldwell, Ida., is building three new ammonium phosphate plants in California. First plant, at Brea near Los Angeles, is completed. The other two plants, at Fresno and Brawley, are slated for completion early next year.

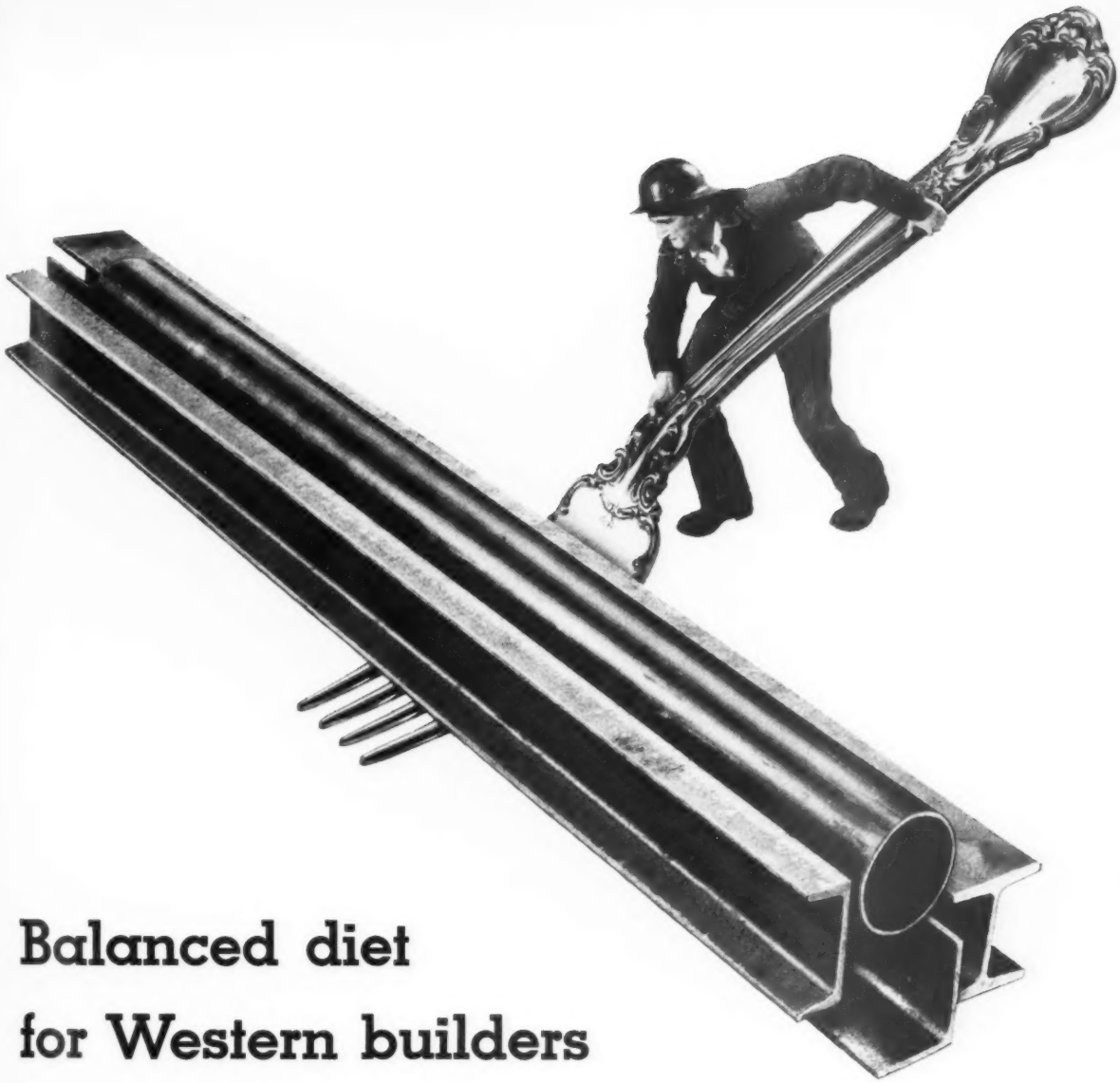
INDUSTRIAL PROPERTIES
Warehouses - Buildings - Lofts - Plants - Factory Sites—Appraisals

SALES • LEASES
Complete Coverage Up-to-the-Minute Lists

COLDWELL, BANKER & COMPANY REALTORS

57 Sutter Street, SAN FRANCISCO 4, Phone SUtter 1-5420
425 - 15th Street, OAKLAND 12, Phone GLencourt 1-7300
900 Wilshire Blvd., LOS ANGELES 17, Phone MAdison 6-0611
1009 Jay Street, SACRAMENTO 14, Phone HUdson 1-1407
3018 Central Avenue, PHOENIX, ARIZONA, Phone AMherst 6-8445

For more details circle No. 236 on Reader Service Postcard



Balanced diet for Western builders

To serve the West's large and growing construction industry, Kaiser Steel produces the most complete range of structural shapes of any mill in the West.

These structural shapes include standard beams, wide flange beams, channels, angles, column sections —plus steel pipe, now used as a structural member in many modern applications.

We are particularly pleased to be associated with the western construction industry . . . for the job they are doing is contributing greatly to the tremendous growth of the West.

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • tinplate • hot rolled strip • hot rolled sheet alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • ingot molds • coke oven by-products

For details and specifications, write: KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, DENVER, TULSA, NEW YORK

For more details circle No. 241 on Reader Service Postcard

FLEET'S IN—One of 106 new mechanically-refrigerated trailers added by Pacific Intermountain Express to its fleet is inspected here by (left to right) R. R. Johnson, P-I-E perishable sales manager; F. C. Howk of Armour & Co.; and Everett Collins, Armour transportation manager. Reefer units are part of $4,000,000 purchase of 476 new trailers. Company is also adding 103 tractors, at cost of $1,300,000, 83 of which will be built in Emeryville, Calif., plant of International Harvester. P-I-E recently purchased land adjoining its Emeryville terminal for expansion of facilities, to include loading dock, freight handling services, maintenance shop, and office space.

EL MONTE PLANT—Testa Manufacturing Co. moves from Los Angeles to new plant in El Monte for expanded production of microscopes, precision lenses, optical instruments and subassemblies.

HARVEY EXPANSION—Construction of new buildings at a cost of $2,000,000 is under way at Harvey Aluminum plant in Torrance, slated for completion in early 1955. They will house 8,000-ton forging press, two 4,000-ton presses, and auxiliary equipment for trimming, heat treating, and other operations.

APPLIED ELECTRONICS — Stanford University's School of Engineering opens new Applied Electronics Laboratory for industrial and government research work. Stanford Electronics Research Laboratory will now be confined to fundamental research and teaching. Dean F. E. Terman is director of both laboratories.

NEW ORDNANCE WORK—San Francisco Ordnance District awards following contracts: over $26,500,000 for production of M59 armored infantry vehicles, to Food Machinery & Chemical Corp. at San Jose; over $5,000,000 worth of 155 mm. chemical shells to be produced by Rheem Manufacturing Co. at San Pablo; one-year service agreement for repairing and modifying government-owned gages to be performed by Huber Tool Works, San Carlos.

BIGGER BONE—A 21,000 sq. ft. addition to main plant is put into operation by Bone Engineering Corp., Glendale. Company does electroforming, investment casting, tooling, and precision machining.

MOVE TO EAST BAY—Liquid Carbonic Corp. leases 3½ acres from Port of Oakland for construction of new plant and will move operations from present location in San Francisco, which has been condemned for construction of a freeway. New $1,500,000 plant is slated to be in operation by July 1955.

NEW BUILDING—Earle M. Jorgensen Co. adds building to its headquarters in Los Angeles to house sheet and strip slitting activities, formerly at a temporary location in city.

STEBER ON COAST—Steber Manufacturing Co. of California is formed in Los Angeles to manufacture and distribute lighting and other electrical fixtures. Parent company is Steber Manufacturing Co. of Broadview, Ill.

OPEN ENCINA PLANT—New Encina steam generating plant at Carlsbad is dedicated by San Diego Gas & Electric Co. Excavation has begun for another 106,000-kw. power unit, scheduled for operation in October 1956.

ROHR IN GEORGIA—New assembly plant at Winder, Ga., will be placed in operation by Rohr Aircraft Corp., Chula Vista, within next few months, to assemble power packages for Lockheed aircraft using components manufactured at Chula Vista.

PROSPECTING — Calaveras Cement Co. undertakes exploratory drilling for natural gas on leased property near Lodi, in an effort to find local source of fuel for its four-kiln plant at San Andreas.

BUY OAKLAND FIRM — Engineered Instruments, Inc., Hayward, manufacturer of electrical, mechanical, and electronic assemblies, acquires D-V Welding Controls of Oakland. D-V specialized controls for arc welding equipment will now be manufactured in Hayward plant of Engineered Instruments, but marketed under former name.

BUY LODI WINERY—Sebastiani Winery of Woodbridge is sold to Kenneth Knapp of Selma and J. L. Buckman and Max Braver of New York, and will be operated under the name of Rio Vista Winery. Purchasers also own Selma Winery.

WILLYS RESEARCH LAB — Willys Motors, Inc., plans to build $250,000 electronics research and development laboratory on 3¼-acre site leased from Stanford University. Laboratory will develop radar, TV, and other electronic equipment. Construction contract will be awarded by Kaiser Engineers, who designed building, with completion scheduled in spring.

AVOCADOS—Calavo Growers will buy packing plant in Ventura County and build new plant in Fallbrook to handle increasing avocado production. Ventura plant, which covers 15,000 sq. ft., will have rated output of over 500,000 flats of avocados per year. Fallbrook plant, which will supplement present Escondido facility, will have a capacity of 1,000,000 flats and area of at least 25,000 sq. ft.

ROOFING PLANT — Pabco Products Co., San Francisco, plans to build new asphalt roofing plant at Wilmington, scheduled to be in operation within a year.

NEW DEPARTURE—New Idria Mining & Chemical Co., Idria, forms new division to manage and operate uranium and manganese mines owned by other individuals and companies.

POMONA SERVICE CENTER— Southern Counties Gas Co., subsidiary of Pacific Lighting Corp., will build $533,000 service center in Pomona, to house distribution, construction, and customer service departments.

BUILD IN NEWARK—American Forest Products Corp. will build new $2,500,000 plant for production of corrugated board in Newark, Alameda County.

O'BRIEN BUYS—Garrett M. Goldberg Paint Co., San Francisco, is purchased by O'Brien Corp. of South Bend, Ind., and will be operated as a division of firm.

ELGIN-NEOMATIC — Elgin National Watch Co., Elgin, Ill., acquires Neomatic, Inc., Los Angeles developer of miniature electronic components. Company will be operated as a wholly-owned subsidiary by ordnance division of Elgin.

CRESCENT CITY PLANT—Timberline, Inc., of Portland, Ore., is building a veneer plant at Crescent City which will cut hardwood, fir, and redwood veneers.

KAISER POWER SEARCH — Kaiser Aluminum & Chemical Co. by agreement with Province of British Columbia will proceed with test drilling and engineering work to investigate possible site for $25,000,000 storage dam on Columbia River. Kaiser has proposed building a water storage dam in Canada to supply downstream hydroelectric power facilities in United States. If a site is decided upon, Kaiser Aluminum will form Canadian company to build dam.

LEMON PACKING — Newly-organized Santa Barbara Coastal Lemon Co. starts construction of lemon packing plant in Santa Barbara. Main building will be 150 x 402 ft., with storage capacity of about 130 carloads of fruit.

Will your speaker be missing?

Will your firm skip having someone on hand at the January conference of 10,500 people representing the industrial buying power of the West? Or, when decisions are being made about plans and purchases, will he be right there to tell them about your products and services?

We told you about that conference on this page last month. It is the occasion when 10,500 people take time out to study the pattern of current Western developments and trends, presented industry by industry.

They don't go to this conference—it comes to them. It is the January Western Outlook number of *Western Industry*, our seventh annual Review and Forecast, bringing the only compilation of such information to be had anywhere, a conference in itself.

Your speaker—if you are farseeing enough to send him—is your advertising message. What better chance to present your story to the industrial customers of the West?

For reservations, write, wire or phone:

Advertising Manager,

WESTERN INDUSTRY, 609 Mission St., San Francisco 5

Phone YUkon 2-4343

Plan it now—reserve early for best positioning—final copy deadline Dec. 20

For more details circle No. 237 on Reader Service Postcard

TEST LAB IN EL SEGUNDO—Wyle Laboratories opens new 21,000 sq. ft. building in El Segundo providing expanded area and equipment for machine testing operations. Company performs "type approval" testing of components and complete systems for independent manufacturers and subcontractors.

PARKDALE MOVES—New factory of Parkdale Co. at 3040 Rosslyn St., Los Angeles, expands space for manufacture of L-P gas products.

SALT FOR SOUTH—Leslie Salt Co. will build $500,000 plant for processing and packaging salt on 40-acre site in La Habra, to be completed within a year.

TV PLANT—New $1,500,000 television manufacturing plant will be built by Hoffman Radio Corp. in Los Angeles, to be in operation next May. Company will transfer manufacturing activities from present plant to new location.

CALL HALT IN WEST—Hyman-Michaels Co. railroad scrap iron yards in both San Francisco and Los Angeles will cease operation, and company's construction equipment division, Hawthorne-Michaels Co., Los Angeles, will be liquidated. Hyman-Michaels plans to concentrate operations in Chicago and St. Louis area.

MERGER OFF—Slick Airways and Flying Tiger Line, Los Angeles, cancel merger plan after failing to reach agreement with Civil Aeronautics Board and labor unions.

AT WORK—New Redding Sand and Gravel, Inc., begins operations in $250,000 plant at Redding.

CLOSE MEAT PLANT—Cudahy Packing Co., Omaha, Neb., plans to close its meat processing plant at Fresno, as well as three other meat plants of the 11 it operates throughout the country, in a move designed to increase profits.

OPERATION TEXAS—Coast Manufacturing and Supply Co., Livermore manufacturer of Trevarno glass fabrics, transfers weaving operations to new $750,000 plant at Seguin, Texas, in vicinity of San Antonio. Home offices, research and development, and finishing, coating, and impregnating operations will continue at Livermore.

ARDEN IN SAN LEANDRO—Arden Farms buys 7½-acre site in San Leandro for construction of $300,000 processing plant to serve company's ice cream division in Northern California.

LITTON GROWING—Litton Industries, Inc., Beverly Hills, acquires two subsidiaries: West Coast Electronics Co., Los Angeles developer and producer of mobile communication equipment and electronic components; and Digital Control Systems, Inc., La Jolla firm which does basic research and development on digital computer systems.

NEW ELECTRONICS PLANT—Telecomputing Corp. begins work on new plant in North Hollywood, to cost about $600,000, for manufacture of electronic computation equipment.

PAUL BUNYAN MILL—Paul Bunyan Lumber Co. will build new mill at Anderson, near Redding, to be in operation by next July. Company already owns mill employing 220 people at Susanville.

COLORADO

BUY DENVER FIRM — Minneapolis-Honeywell Regulator Co. of Minneapolis acquires Heiland Research Corp. of Denver, to be operated as a new Honeywell division with present personnel. Heiland manufactures precision scientific instruments and photographic flash equipment.

WESTERN ABC—New $100,000 plant will be built at Loveland by ABC Western Co., branch of ABC Coach Co. of Pinconning, Mich., on a 5-acre site provided by the Loveland Development Fund, Inc. Plant, scheduled to open in January 1955, will produce from four to eight trailer coaches daily.

BUSINESS BALLOONS—Ellswood Balloon Imprinting Co., established in Denver last year, is reported to have established gross income of over $50,000 annually by supplying printed balloons to a national market.

NERVE GAS PLANT?—Army will build $8,000,000 plant for production of chemical-type ammunition at Rocky Mountain Arsenal in Denver, located next to Chemical Corps' filling and loading plant. Plant, to be completed in 15 months, will reportedly package nerve gas, which it was revealed several months ago is manufactured at the Rocky Mountain Arsenal.

IDAHO

NATURAL GAS—Greeley Gas Co. of Greeley, Colo., files application with Idaho Public Utilities Commission for construction of feeder pipeline to supply gas to 10 eastern Idaho cities from future pipeline of Pacific Northwest Pipeline Co. City of Idaho Falls, which would be served by Greeley line, considers possibility of operating a municipal natural gas service.

COOPERATE—University of Idaho at Moscow enters joint educational program with Atomic Energy Division of Phillips Petroleum Co. at National Reactor Testing Station, Arco, providing for graduate study in laboratories at the station. Classes will be taught by staff members of the station.

NEW BOISE FIRM—Engineering Services, Boise, is in full operation designing and manufacturing materials handling equipment for aggregate plants, mixing plants, and mining operations.

SUPER PHOSPHATE PLANT—Jefferson Lake Sulphur Co., New Orleans, will begin construction of $3,000,000 fertilizer plant in southeastern Idaho within next two months. Plant will employ about 80 men in production of triple super phosphate from local phosphate deposits, with an output of 80,000 tons per year.

MONTANA

GAS FROM CANADA—Montana Power Co., Butte, applies to Federal Power Commission for approval to import another 60,000,000 cu. ft. of gas daily from fields in southeastern Alberta. Company is now importing up to 40,000,000 cu. ft. per day for use by Anaconda Copper Mining Co. Gas is produced by Canadian-Montana Gas Co., Ltd., and delivered by Canadian Pipe Line Co., both wholly-owned subsidiaries of Montana Power.

DRILLING FOR OIL—Northern Pacific Railway Co. signs agreement with two oil companies under which exploratory oil wells will be drilled on its properties in Fallon County. One is with Mobil Producing Co., a subsidiary of Socony, and the second with McAlester Fuel Co.

NEVADA

TITANIUM—Henderson plant of Titanium Metals Corp. of America reaches full capacity production of 10 tons per day of high quality titanium sponge.

MILL AT CARSON—Tahoe-Reno Lumber and Timber Co. plans year-round operation of combination sawmill and planing mill at New Empire, employing 18 to 20 men, in building formerly used by Nevada Match Co.

TO OPEN TUNGSTEN MILL—Minerals Engineering Co. of Grand Junction, Colo., leases Baltimore-Camas tungsten mill at Ely, Nev., to process low-grade tungsten ores, at a capacity of 150 tons per day. Concentrates will be shipped by truck to Salt Lake Tungsten Refinery Co., Salt Lake City. Sylvania Electric Products Corp. also holds interest in refinery.

DEDICATION — Rare and precious metals experiment station of Bureau of Mines is dedicated in Reno. New building is located on University of Nevada campus. Regional office of Bureau of Mines will continue to be located in Albany, Ore.

NEW MEXICO

CO-OP POTASH PLANT — National Farmers Union plans to build potash plant in southeastern New Mexico, at cost of over $10,000,000, and is reported to be negotiating leases of ore deposits in Lea and Eddy counties.

POTASH AGAIN—Potash mine and refinery project costing $15,000,000 is reportedly under consideration by Freeport Sulphur Co. of New York and Pittsburgh Consolidation Coal Co. of Pittsburgh, to be located east of Carlsbad.

FASTENERS—Nationally-known manufacturer of clothing fasteners is reported to be interested in setting up a branch plant in Albuquerque which would employ from 125 to 250 men.

IN OPERATION—Kerr-McGee Oil Industries, Inc., begins operation of ore crushing and screening section of its uranium ore processing plant at Shiprock, and takes over sampling plant of Atomic Energy Commission. Mill will employ about 100 men.

KING-SIZE — Potash Co. of America awards contract for extension of underground conveyor system at Carlsbad mine to total length of 7¼ mi., reportedly the country's longest. Expansion program will be carried out by Hewitt-Robins, Inc., designer and builder of present 5,800 ft. long conveyor in mine, installed in 1952. When completed in late 1955, conveyor belt will carry ore in continuous flow from mining area to refinery.

OREGON

OREGON CITY SALE — Oregon City Manufacturing Co., clothing company, sells property and buildings at Oregon City to Publishers Paper Co., owned by Los Angeles Times and Mirror and Deseret News, Salt Lake City. Oregon City Manufacturing will relocate its operations within another 15 months and until that time continue manufacturing clothing in its present plant.

SP BUYS LAND—Southern Pacific Co. buys 277 acres of land south of Beaverton for planned development as light industrial area.

WOODEN AIRPLANES—North Pacific Products Co., manufacturers of toy balsa wood gliders and airplanes, opens new plant in Bend. Plant, leased from Murray Bros. Construction Co., is located on part of a 12-acre site recently acquired by Bend Chamber of Commerce for use by light industry.

WOOD PRESERVING—Pope & Talbot, Inc., completes expansion of its pressure treating plant at St. Helens, and incorporates in it facilities moved from Linnton plant formerly operated by West Oregon Lumber Co. Expanded mill has six pressure retorts, supplying three types of treatment for Douglas fir to meet all degrees of exposure.

LOW BIDDER—General Electric Co., Portland, is awarded $11,114,620 contract by Army Corps of Engineers for furnishing eight 82,105-kva. generators for The Dalles dam. Two of the units will be installed by November 1, 1957, and the others will go on the line at three month intervals after that date.

WILL PROCESS CHROME — Pacific Northwest Alloys begins construction of chrome processing plant at Coquille, under government contract, for treating chrome concentrate stockpiled during the war.

TO MINE CHROME—Mineral Sand Co. of Lansing, Mich., leases over 4,000 acres of land from Coos County for chrome operations and acquires site for warehouse from Port of Bandon. Company reportedly has a new process for upgrading ore extracted from black sand.

WOOD PRODUCTS PLANT — Mt. Hood Hardboard and Plywood Co-operative is incorporated at Estacada. Group of backers plan to build $1,000,000 plywood and hardboard plant.

MONARCH SOLD—Monarch Forge & Machine Works, Portland, is acquired by Downington Manufacturing Co. of Downington, Pa., to be operated as a wholly-owned subsidiary. Both companies manufacture machinery.

WASHINGTON

BUILDS PREFABS—Haskins Co., Spokane, is expanding plant and adding equipment for manufacturing prefabricated steel buildings suitable for commercial storage and farm use.

SEEK COURT REVIEW — Westcoast Transmission Co., Inc., requests court review of Federal Power Commission decision which favored Pacific Northwest Pipeline Corp. as supplier of natural gas to Northwest. Case is brought into U. S. Court of Appeals at Philadelphia.

PIPELINE AT WORK—First crude oil from Alberta is delivered to General Petroleum Corp.'s Ferndale refinery, using 26-mi. spur pipeline from Vancouver, B. C., terminal of line from Alberta wells. Refinery is now working on test runs and will be ready for operation by mid-November.

MILL REOPENED — M&M plywood plant at Longview is placed in operation by Long-Bell Lumber Co., recent purchaser. New dryer and rip and trim saw are being installed, and further improvements are planned. Plywood production is expected to reach 3,600,000 ft. per month.

NAVY CONTRACT — Puget Sound Bridge & Dredging Co. is awarded contract for construction of two destroyer escorts, totaling $15,000,000. Work will be performed over a period of 33 months, employing 600 men for first year and 200 men for remainder of period.

WYOMING

SELL ALUMINA PLANT — General Services Administration accepts $1,200,000 bid of Ideal Cement Co., Denver, for government's experimental alumina plant at Laramie. Company will use plant for production of lightweight aggregate for concrete. Contract provides that company will operate plant for at least 10 years and will return it to government for production of alumina whenever needed. Monolith Portland Midwest Co. protests government decision with briefs filed in federal court.

ORE-BUYING STATION—Atomic Energy Commission will open ore-buying station at Riverton sometime after first of year. Station will be operated for AEC by American Smelting and Refining Co.

A

Aeroquip Corporation 96
American Appraisal Company, The 114
American Blower Corporation, Sub. of American Radiator & Standard Sanitary Corporation 27
American Chain Division, American Chain & Cable 62
American Society of Tool Engineers . . . 85
Anaconda Wire & Cable Company 45
Arwood Precision Casting Corp. 16

B

Bethlehem Pacific Coast Steel Corp. . . . 6
Brodhead Steel Products Co. 52
Butler Manufacturing Company 115
Bruning, Charles, Co. 82

C

California Bank, Los Angeles 78
California Barrel Company . . . . . Cover 2
Calstrip Steel Corp. 66
Carver Pump Company 103
Chicago Bridge & Iron Company 61
Chisholm-Moore Hoist Corp. Columbus McKinnon Chain Corp. 24
Chrysler Corporation 77
Cleveland Vibrator Co. 110
Cleveland Worm & Gear Co. 107
Clipper Belt Lacer Co. 94
Cold Metal Products Co. of Calif., The . . . . . Cover 3
Coldwell, Banker & Company 118
Colson Corporation, The 91
Columbia-Geneva Steel Division, United States Steel Corp. . . . . 59 & 71
Compton Foundry 115
Consolidated Freightways 8
Crane Co. 79

D

Dempster Brothers, Inc. 67
Denver Fire Clay Company, The 70
Diamond Chain Co., Inc. 53

E

E. H. Edwards Co. 113
Electrolift, Inc. 92
Elwell-Parker Electric Co., The 106
Emerson Engineers, The 83
Empire Steel Building Co. 98

F

Falk Corporation, The 19
Federal Tool & Manufacturing Co. 97
Fernholtz Machinery Company 101
Food Machinery & Chemical Corporation, John Bean Division 109

G

Galland-Henning Mfg. Co. 95
Garfield Chemical & Manufacturing Corp. 98
Garrett Supply Co. (Division of Garrett Corp.) 51
General American Transportation Corporation 12
General Appraisal Co. 104
General Paint Co. 72
General Petroleum Corporation 21

H

Hassall, John, Inc. 84
Haynes Stellite Co., Union Carbide & Carbon Co. 28
Hollaender Mfg. Co., The 107
Holz Tire & Rubber Co. 88
Horspool & Romine Mfg. Co., Inc. 109
Howard Supply Company 47

I

Industrial Wire Products Corporation 110
Inertol Co., Inc. 22

J

Johnston, A. P., Co., Inc. 124
Jorgensen, Earle M., Company 9

K

Kaiser Steel Corporation 119
Krusen Wire & Steel Co. 103

L

La Pierre-Sawyer Handle Company 106
Linde Air Products Co., Union Carbide & Carbon Co. 14
Lovejoy Flexible Coupling Company 105

M

Maas, A. R., Chemical Company 81
Magline, Inc. 92
Mathews Conveyer Company 60
Minnesota Mining & Manufacturing Co., Industrial Adhesives 10
Moffett Engineering Co. 111
Monarch Rubber Company . . . . . 48 & 49
Moore Dry Dock Company 56

N

National Supply Company, The 11
National Vulcanized Fibre Co., Fibre Specialty Division 63
National Welding Equipment Co. 3

O

Oakite Products, Inc. 96
Ohio Seamless Tube Co. 25

P

Pacific Gas and Electric Company 75
Pacific Scientific Company 5
Pacific Telephone and Telegraph Company 80
Perin, Ira G., Co. 102
Powell Pressed Steel Co., The 22
Powers Regulator Company . . . . . 94 & 97
Progressive Machine Company 111

R

Republic Supply Company, The 15
Revere Copper and Brass, Inc. . . . . 42 & 43
Revolator Company 114
Richards-Wilcox Mfg. Company 74
Richfield Oil Corp. 23
Ridge Tool Company, The 89
Russell, Burdsall & Ward Bolt & Nut Co. . 18
Rust-Oleum Corporation 29
Ryerson, Joseph T., & Son, Inc. 30

S

Skil Corporation 13
Shell Oil Company 58
Smith Tool & Engineering Co. 105
Snap-On Tools Corp. 76
Soule Steel Company 65
Southwest Steel Rolling Mills 87
Standard Conveyor Co. 104
Standard Oil Company of California . . . 55
Stanley Works, The 26
Stauffer Chemical Co. (Industrial Div.) 73
Stephens-Adamson Mfg. Company . . . Cover 4
Surety Rubber Company 84

T

Thermoid Western Co. 17

U

Union Oil Company 69
Union Pacific Railroad 57
U. S. Electrical Motors, Inc. 93
United States Steel Corporation . . . . 59 & 71

V

Victor Equipment Co. 90
Viking Pump Company 94

W

Western Gear Works 7
Western Industry . . . . . 113 & 121
Western Insulated Wire Co. 85

Y

Yuba Manufacturing Co. 86

Johnston Stainless Welding Rods

Practical, Down-to-Earth Welding Rods
Alloys as they are supposed to be

Corrosion Resistant—
Clean metal

Strong—
Low in cracking

A. P. JOHNSTON CO., INC
1845 E. 57th St., Los Angeles 5

For more details circle No. 238 on Reader Service Postcard

75
5
80
02
22
97
11

15
43
14
74
23
89
18
29
30

13
58
05
76
65
87
04
55
26

73
r 4
84

17

69
57
93
71

90
94

7
121
85

86

954

YOU CAN HAVE THE RIGHT SPRING STEEL *IN ANY QUANTITY.* RIGHT AWAY

.50% Carbon, Cold Rolled, Annealed, Completely Spheroidized
.75% Carbon, Cold Rolled, Annealed, Completely Spheroidized
.95% Carbon, Cold Rolled, Annealed, Completely Spheroidized
.75% Carbon Tempered Spring Steel
.90/1.05% Carbon Blue Tempered & Polished Thickness Gauge (Feeler Stock)
Tempered Gutter Broom Wire

You don't have to buy flat spring steel in mill quantities and wait for deliveries in order to have the right steel for the job.

Nor do you have to "make do" with a grade that doesn't adequately meet your requirements or use a more expensive grade to be sure of getting the properties you must have.

From our complete stock of spring steels, we can fill your requirements immediately with the *right* steel in the *right* gauge and width . . . in any quantity . . . in coils or cut to length.

Perhaps we can also suggest a grade that will do your job better or more economically.

Why not check with us? Just **Phone PLeasant 3-1291**

Check with us also for

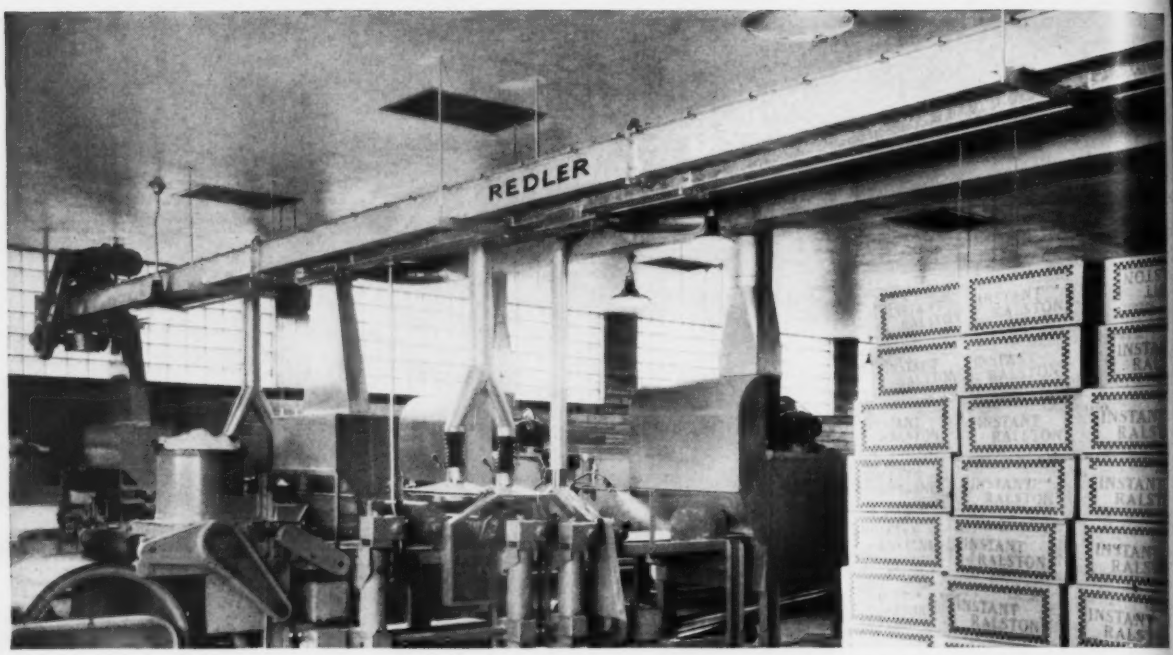
Low Carbon Cold Rolled Strip • Shim Steel • Electro-Zinc Coated Strip • Stainless High-Tensile • Stainless Annealed and Intermediate Tempers • Paintloc and Zinc Bond • Flat Wire • 4130 Aircraft Quality Strip Coils or Sheets and Plates • Hot Dip Galvanized Sheets • Tin Coated Steel • Custom Slitting of your Metals

the Cold Metal Products co. of California

6600 McKINLEY AVENUE • LOS ANGELES
SAN FRANCISCO SALES OFFICE: 111 Sutter St., DOuglas 2-1794

For more details circle No. 239 on Reader Service Postcard

For more details on back cover circle No. 240 on Reader Service Postcard



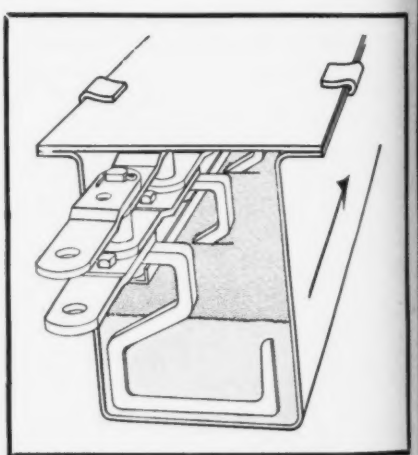
RALSTON-PURINA COMPANY, RY-KRISP PLANT
This coordinated handling system includes three REDLER Loop-Boot Elevators and three REDLER Run-Around Conveyors. Rye flour is picked up from storage and lifted to another floor, then transferred to the Run-Around Conveyors. These 48-foot conveyors discharge selectively to various processing machines through multiple gates. Excess flour continues to circulate and is spouted back to storage for pick-up and recirculation as needed. Each of the REDLER units has a capacity of 300 lbs. per hour, which can be easily increased to 600 lbs. per hour.

Clean, Automatic "Pick-Up and Delivery" for Rye Flour

Immaculate cleanliness in the handling of raw materials—from receiving through final processing—is every-day routine at the Ralston-Purina Company Ry-Krisp plant.

S-A REDLER Conveyors and Elevators that move rye flour in completely sealed conveying systems play a big part in maintaining these standards of purity. Possibility of contamination, leakage and spillage are eliminated. In addition, the REDLERS have helped to reduce costs by continuous integration of handling and processing operations.

Hundreds of other plants are today enjoying similar benefits from REDLER Conveying Systems. *How about you?* REDLERS require little space—can be economically engineered to fit any plant layout with minimum construction. Find out what REDLERS can do to help you. Write for free survey, or mail coupon for our Bulletin No. 140.



Cross section of sidepull REDLER illustrates flow of material in casing below chain track. Unit is self feeding and can recirculate material when it is not taken off at discharge. Material is simply recirculated in conveyor unit until taken off. As REDLER begins to discharge, feed is automatically resumed.

SINCE 1901 S-A STEPHENS-ADAMSON MFG. CO.

STEPHENS-ADAMSON MFG. CO.
Factories at Aurora, Ill.; Los Angeles, Calif.; Belleville, Ont.

2227 E. 37th Street
Los Angeles 58, Calif.

1007 E. Burnside Street
Portland 14, Ore.

151 Mission Street
San Francisco 5, Calif.

714 Joseph Vance Bldg.
Seattle, Wash.

STEPHENS-ADAMSON MFG. CO.
2227 E. 37th Street, Los Angeles 58, Calif.

Please send me your Bulletin No. 140 on REDLER Conveyors.

NAME_____

COMPANY NAME_____

ADDRESS_____

CITY_____ ZONE____ STATE_____